# HANDBOOK OF ARCHITECTURE

## Part II

## ARCHITECTURAL STYLES

### Volume 3; Part 1

### EARLY CHRISTIAN AND BYZANTINE ARCHITECTURE

By Dr. Heinrich Holtzinger
*Formerly Professor of the History of Art at the Polytechnic School in Hanover*

*Third Edition*

*LEIPZIG*

*1909*

*Translated by N. Clifford Ricker D. Arch.*

Professor of Architecture

UNIVERSITY OF ILLINOIS

*Urbana. Ill.*

1909

HANDBOOK OF ARCHITECTURE

Part II.
ARCHITECTURAL STYLES.

Historical and Structural Development
Division 2.
MEDIAEVAL ARCHITECTURE.

Volume 3. First Half.

Section 1. Early Christian and Byzantine Architecture.

PREFACE.

The investigation of the history of the architecture of the Early Christian period is yet in constant progress; much new material has been obtained in recent years. The earlier and comprehensive descriptions as given by H. Hübsch and others, however deserving in their time, and however much may be due to the amount of careful labor by which they were built up, must today be recognized as requiring extension and correction in essential points, and it therefore occurs, that the excellent work of A. Essenwein, the place of which this half volume is intended to occupy, must share in the fate of becoming antiquated in the degree in which it more closely or more loosely adhered to those earlier preliminary works.

When from the editors of the "Handbook", there came to the writer the honorable commission to take charge of the second edition of this half volume, after the too early death of Essenwein, he believed that in view of the basis since greatly extended by late researches, this edition would correspond therewith only by the almost complete abandonment of the structure erected by Essenwein, so that he was therefore compelled to decline the attractive labor. --- The invitation resulting therefrom, to write an entirely new work in place of that by Essenwein, the author has endeavored to fulfil according to the best of his ability, with the desire and hope to furnish to scholars a basis and an incitement for their own studies, according to the present state of research in a field everywhere demanding further labor. By the present description is intended no exhaustive general history, and just as little a list of Early Christian monuments and treasures: the author hopes to soon give both of these in another place: here should rather be displayed the most important matters in the clearest light. --- To aid the latter, the series of illustrations for Essenwein's description was revised and considerably extended by consent of the editors and the publisher. --- In a series of orthographic and other variations from the custom of the author must be seen a concession to the rules established for all the volumes of the "Handbook."

Hanover. July 1898. H. Holtzinger.

# DIVISION II. MEDIAEVAL ARCHITECTURE.

## Section 1. Early Christian and Byzantine Architecture.

### INTRODUCTION.

1. Historical Place of Early Christian Architecture.

The history of Early Christian architecture does not afford, like the Egyptian, the idea of an isolated phenomenon without influences from the past; it likewise never knew the youthful period of organic growth from itself; it does not form the beginning, but the end of a long and millenial development.

There is no sharply marked chronological separation between antique and Early Christian art; there is no ending and commencing anew, but a slow transition lasting through centuries, a gradual transformation, though not a new creation.

While within the antique pagan society, there was developed a new order on the basis of the Gospel, the antique form of life was not cast overboard as a whole, neither in the organization of the State nor in civic life; a new spirit rather commenced to slowly illuminate the ancient world; it did not occur suddenly, but was changed into new forms in a gradual course. This process manifests itself most plainly in the formative arts. The art of the first Christian centuries has not least in this its high charm and special worth, that it permits us to view the slow overclouding of the antique in the enlightening splendor of the new Christian spirit.

We are here engaged with the ending of the antique, of Greco-Roman architecture; but this art at the same time forms the beginning or the atrium of the church architecture of the middle ages. Its explanation and its understanding find the beginnings of church art substantially in the retrospect of its direct ancestor, the antique, and it is therefore a logical claim for an organic mode of treatment, or to attempt a description in direct sequence to antique architecture.

The period, whose architectural creations we consider here, begins with centuries belonging to those most clearly illuminated in the history of antiquity, thanks to the wealth of the evidence preserved. We also mean that we should expect to find a rich and clearly flowing source for the knowledge of the art

of the period in the service of Christianity and the church. Even if not entirely deceived, this hope will be put to a hard test. There is required a most careful testing of freqeuntly uncertain and opposed traditions, and cautious conclusions concerning important monuments from later information concerning matters strongly disputed, or even entirely vanished. For better was here apparently often the enemy of good. In zeal and a desire for its own creations, the church has for huddreds of times not only transformed its own earlier works in the domain of architecture, but it has utterly destroyed and replaced them by new ones. Only the most careful study of frequently slight remains and a critical examination of the sources for the history of the different monuments can here restore again the original idea.

Certainly not everywhere have the monuments suffered such thorough transformation and destruction, as in the centre of ecclesiastical life in the city of Rome, as well as elsewhere on Western soil; almost untouched by the hand of destruction and only gnawed by the tooth of time, exist the wonderful architectural monuments of Syria; rich glimpses of the earliest Christian style of architecture are afforded to us by the recently discovered monuments in North Africa. We must deduce the whole from all these, with a comparative glance also at written tradition, in order to obtain a general idea and to reconstruct the lost in image or in spirit; and there results in spite of everything a satisfactory total of assured materials.

A. Subterranean Tombs of Early Christian Period.

2. Place of Sepulchral Architecture.

The attempt at a chronological representation of the course of Early Christian architecture would afford the great advantage of a purely systematic method of presentation, which would place the most important matters at the front; but an unlucky fate has befallen the historian of the first Christian centuries of Christian activity in architecture; works of secondary importance have been preserved, while only scattered remains are available for the steps of the development of the higher sacred architecture, in order to produce a description with the aid of literary traditions, not always free from hypotheses and marks of doubt. Those oldest creations remaining to us, as works of the second order, like the oldest remains of Christian painting and sculpture, belong to the great domain of sepulchral art; they are the numberless tombs within and above the earth with their rich contents of such high importance to the knowledge of Early Christian events. The purpose of this half volume only permits the latter to be suggestively treated; but in consideration of everything architectural in this domain, and aside from the few larger buildings above ground, we must constantly keep it before our eyes, that it here unfortunately concerns not the earliest Christian architecture, but only the earliest now remaining.

Chapter 1. Arrangement of the Catacombs.

3. Idea and General Design.

Among Christian tombs, with few exceptions, the subterranean structures spared from destruction , now entirely exceed in age the buildings of similar purpose above ground. But not merely for this reason, but for chronological interest do they deserve thorough estimation in the history of architecture; they likewise formally represent a highly peculiar class of structural designs in comparison with all architectural undertakings of the same or of preceding periods in the domain of sepulchral architecture. From the separate tombs as well as from the community tombs, the columbarias of the antique, they differ in the most marked way, and they claim a special place in the Chapter on the sepulchral architecture of the period.

A law governing all classical antiquity required the dead to be buried only outside inhabited places. Along the great roads extending from the gates of cities into the country still rise the ruins of mausoleums and the tomb steles; we must also wander along these roads to find the entrances to the sepulchres of the earliest Christian communities. Only when we have left behind us the first of the antique mile-stones, can we hope to find these entrances to the martyrs, that today are not apparent or are concealed, in the poorest form frequently only appearing as partly fallen stairways, and yet in great part awaiting discovery. Scarcely any other class of ancient monuments has in the course of centuries fallen into such complete oblivion, as the Christian cemeteries, which yet in the first four centuries formed an important part of Early Christian life, however paradoxical this may sound. In dense crowds the Roman citizens made pilgrimages to the tombs of the heroes of their faith; with artistic splendor were these burial places conceived, which in their purpose were likewise not inferior to those of pagan sepulchral structures. There were external influences, the rapid destruction and the increasing insecurity of the vicinity of the cities, as a result of the augmenting barbaric invasions in the 5 th century, whereby the earlier regular travel to the sepulchres was obstructed, and after a portion of their contents most precious to the faith was buried within the cities, these were gradually ab-

abandoned to isolation and finally to complete oblivion.

4. Name.

Thus in the Roman Campagna only a single larger structure of this kind, near the Church of S. Sebastiano on the Appian Way, continued to be known to pilgrims in the middle ages; the designation "ad catacumbas", i.e., ad accubitoria, at the sepulchres, which adhered to them, remained thenceforth as a technical expression for such structures in general, and thus the word "catacomb" has become in modern speech a distinctive characteristic for connected subterranean groups of tombs as a distinction from isolated tombs.

In the year 1578, an accident led to the discovery of the Roman catacombs, at first on Via Salaria. For a long time there succeeded an unfortunate search for inscriptions, paintings, and portable objects, followed only in our century by a systematic excavation, first by the Jesuit Father Marchi, then by that master of Christian archaeological research, Giovanni Battista de Rossi (d. 1894), whose great work is energetically continued by his pupils and successors (Orazio Marucchi, Enrico Stevenson, Pietro Crostarosa, and others).[1]

*Note 1. Bibliography:-- Bosio, A. Roma sotteranea etc. Rome. 1632; Latin translation by P. Aringhi. Rome 1651. -- MARCHI. Monumenti primitivi delle arti cristiane etc. Rome 1844. -- ROSSI, G. B. de. La Roma sotteranea cristiana. Rome. 1865-77; Vol. 4 in preparation. -- ROSSI, G. B. de. Bulletino di archelogia cristiana, since 1863. -- SCHULTZE, V. Die Katakomben von San Gennaro zu Neapel. 1877. -- Same. Die Katakomben. Leipzig. 1882. -- KRAUS, F. X. Roma sotteranea. 2 d Ed. Freiburg. 1879. -- ROLLER, TH. Les Catacombes de Rome etc. Paris. 1881.*

5. Arrangement.

The labyrinthine character shown by these cemeteries today (Fig. 1)[2] is not a representation of the original plan, but only the result of long development. Far removed from a planless excavation, much more from the use of abandoned excavations for sand, the plan of the catacomb tombs proceeded according to a definite scheme and within strongly fixed limits. After the piece of ground devoted to the arrangement of the tombs by an individual or a community had been acquired by a burial

society formed according to antique custom, the boundaries of the area were laid out and fixed by inscribed boundary stones (- - feet front and - - feet in depth); then commenced the excavation in the ground. A stairway led down to a corridor (ambulacram, crypta), that first extended along near the boundary of the oblong area, turning at right angles at the corners. Cross galleries connected the longitudinal corridors; other passages were made as needed. The dimensions of these passages in the catacombs of the Roman Campagna are kept within narrow limits, in view of the tufa stone, a material not suited for wide spans; abundantly high for a man and 2.62 to 3.28 ft. wide, these corridors extend with slightly arched ceilings. The graves are cut in the walls, three or four above each other with the longer side next the passage, simple oblong recesses of the length of the body to be buried, after placing which, they were closed in front by a marble slab or brick wall, that exhibits by incised or painted inscription the name, age, day of death or burial of the deceased, with the addition of a pious wish or of a simple Christian symbol. The mediaeval search for relics, that rummaged all the graves with impious or hostile hands, carelessly broke most of these enclosing slabs (tabulae) and robbed the graves of their rich contents in coins, house vessels, toys, etc. Whatever remains uninjured has recently in part been gathered by de Rossi into the Christian museum of the Lateran in Rome.[3]

*Note 2. From SCHULTZE, V. Die Katakomben. Die altchristliche Grabstätten etc. Leipzig. 1882.*

*Note 3. See ROSSI, G. B. de. Inscriptiones christianae urbis Romae etc. Vol. 1. Rome. 1857 - 61. -- Also especially, ROSSI, G. B. de. Bulletino di archaeologia cristiana. Appreas since 1863.*

When all available space was filled with graves, then excavations were frequently carried deeper in the ground, a similar plan being produced a second, or even in a fifth or sixth story, and for adjacent grounds, the different areas were also often connected underground.[4] Thus arose the apparently inextricable labyrinths of the Catacomb of S. Callisto on the Appian Way, whose interlaced galleries may be referred to originally separate systems. The simple rectangular recesses visible in

Fig. 2 (loci, loculi) were by far the most common, but not the only form of wall grave. Besides them occur the graves covered by an arched recess (arcosolias), Fig. 3, and entirely distinct, the table graves, the latter with a rectangular recess instead of a semicircular one (Fig. 4). The closing slab lies horizontally upon the grave in these niches.

*Note 4. From KRAUS, F. X. Roma sotteranea. 2 d edit. Freiberg. 1879.*

## Chapter 2. Decoration of the Catacombs.

### 6. Painting.

The long series of wall graves in the passages of the catacombs are usually interrupted by narrow doorways forming entrances to more spacious tomb chambers, the cubiculas.[5] We find again in them both forms of graves, the loculi and the arcosolias. In these rooms, sometimes lighted from above by an air or light shaft (luminare), there could be more richly developed, than in the narrow corridors, the cheerful decoration on the walls and ceilings.[6] For after the sexton (fossor) completed the graves (Fig. 5[7]), the painter commenced his work in the passages and chambers. It resulted in taking from the city of graves the appearance of excavations in the rocks and ground, in lending it the character of an artistic, comfortable, and even cheerful home for the dead, who merely slept here while awaiting the call to resurrection. In the adornment of these resting places occurs no thought of the fear or horror of death; the pictures and inscriptions on the walls and ceilings only preach a pious and steadfast hope in an awakening, sometimes verbally, sometimes in a symbolically expressed painting, in which the saving truths of the old and new covenants, of protection promised by God, salvation, which he already effected in miracles, was expressed in clear and simple scenes depicting only the germ of the picture. The miraculous rescue of Jonah or of Daniel, or the Israelites languishing in the desert, the resurrection of Lazarus, the feeding of the ten thousand, this and many similar events are the untiringly reported scenes, which at the same time aim to freshly call to mind anew the church liturgy. It does not surprise us there, if in accordance with the syncretic character of the civilization of that period, sepulchral and symbolic representations slip in from the conquered hostile faiths, and whose grand ideas of a life continued in the world to come, of the conquest of everything evil, and other like ideas apparently allied to Christianity. Thus there appears beside the good shepherd of the gospel, who is filled with love and bears the lost sheep to the flock (Fig. 6), the Thracian bard Orpheus, who knew the hostile opposition of nature to the all-compelling harmony (Fig. 7[8]).

*Note 5. For a more complete explanation of this and similar names, as in general for all questions less concerning technics than archaeology, I must refer to my earlier published treatise on the same theme; "Die Altchristliche Architektur in systematischer Darstellung." Stuttgart. 1888.*

*Note 6. It is permissible to borrow the following concise indications from my book mentioned in the preceding note, for the pictorial decoration of the catacombs.*

*Note 7. From Essenwein, A. Die Ausgänge der Classischen Baukunst. (Handbuch der Architektur. Part II. Vol. 3. 1st hf.) Darmstadt. 1886.*

*Note 8. After Garucci. R. Storia dell, arte cristiana, etc. Prato. 1872. Vol. 2.*

It is not the purpose of this volume to more than generally describe the meaning of the paintings in the catacombs; it must here suffice to refer to the general character of the decoration by painting. The general impression is first striking in more than one respect. We are astonished by the richness, the grace, and the cheerfulness of the decoration, as well as by the peculiar choice of the motives. How we have to understand the latter is indicated above, and also on other points is readily explained the surprise at first, if we consider this Christian decorative painting not in itself, as something opposed to or contending against the non-Christian antique, but with regard to what it actually was with the most complete consciousness; an unbroken continuation of Roman antique art with its canon of forms, its laws, and in part its significance. In the antique sepulchral buildings, as they lie uncovered on Via Latina, on the Appian Way and elsewhere, we find the same bright, festal and cheerful ground tones, the brilliant walls and ceilings, the charming subdivision of the rooms, the graceful ornament, the rather suggestive than fully executed representation, that is often satisfied by a single figure, narrating thereby an entire story (compare Moses striking the rock for water, or loosing his sandals before the burning bush, Jonah in the shadow of the gourd, Christ restoring life to Lazarus, and the like in Figs. 6 to 10). 8. 9.

*Note 8. From Garucci. R. Storia dell' arte cristiana, etc. Prato. 1872. Vol. 2.*

*Note 9. From Kraus, F. X. Geschichte der christlichen Kunst. Vol. 1. Freiburg. 1896.*

The decorative skill of the artists working under unfavorable conditions of space and light was especially developed in the painting of the ceilings in the chambers (cubiculae) with their generally concentric subdivision; the lunettes and soffits of the arcosolias were preferably divided into similar panels, and likewise the walls.

The execution is luxuriant throughout, and the color scale is simle on the whole; besides white as a ground, there prevails a reddish-brown for the strongly sketched outlines; to these are added yellow, red, blue, and green, for use. The stucco coating, by which the tufa walls of the Roman cemeteries are covered, is of inimitable fineness.

The comfortless appearance presented by the grave recesses today finds a pendent in the reckless fanaticism, that produced the appearance of many graves of martyrs and their nearest surroundings, where we see the rich painted ornamentation of the lunettes and the walls of the arcosolias destroyed, not by the hands of relic hunting pilgrims, but by the Christians of the first century, who from the superstition of participating earlier in the resurrection with the martyrs, had a grave prepared in the closest vicinity to the saint (Figs. 9, 10).

Already a hasty glance at this and similar chambers (cubiculas)averaging in their floor areas about 107.6 sq. ft.shows us, without the need of other evidence, the untenability of earlier contested and occasionally mistaken views, that the catacombs likewise served for the regular assemblies of the Christians for divine services. The quite rarely found seats cut from tufa or the remains of marble altar rails indeed indicate the custom of celebrating a memorial ceremony at the grave on the anniversary day of the deceased, a mass at the body (missa ad corpus); a larger number of believers repeated this ceremony as a public mass (missa publica) in the open country above the catacomb, in the cella with triple choir, (cellae trichorae), or other church buildings erected in honor of the tomb, which soon assumed the form of the city churches, the basilicas.(See below).

## Chapter 3. Location of the most important Catacombs.

### 7. Roman Catacombs.

A Description or even an enumeration of all Christian catacombs cannot be the aim of this book. The Roman communities alone possessed such groups of tombs along all the country roads, that extended from the gates of the Aurelian walls; to these were added the likewise numerous suburban cemeteries, the burial places of the now vanished towns of the Roman Campagna.

Of the Roman catacombs heretofore discovered and made accessible, whose galleries would extend to 547.5 miles if placed together, some certainly extend back in their foundation to the beginning of the second century of our era, and others even into the first. Names having a clear ring in contemporary Roman history are here chiseled in the grave slabs and illustrate in an unexpected way the earliest history of the Christian church.

To the oldest cemeteries of Rome belongs that of Donatella on Via Ardeatina southwest of Rome. The extremely extensive plan was produced by the union of originally private cemeteries, which were enlarged into a community cemetery. There still stand the ruins of the formerly richly adorned entrance room; particularly beautiful paintings of the first century ornament the corridors; the inscriptions tell of the penetration of the new faith into the family of the emperor, the Flavian family (gens Flavia). The architecturally intertesting chamber of Ampliatus (cubiculum),originally a separate family tomb, was later connected with this cemetery.

A brief walk further eastward brings us on the Appian Way, the queen of roads, as antiquity named it from the rich series of tombs. In the midst of mausoleums of the republican and the imperial periods, there mingle here the Christian cemeteries with cells above ground and extensive crypts of even five stories in depth, in the richest combinations. The Cemetery of S. Callisto, named from the Pope of that name, who had the control of this plan in his hands at the beginning of the 3 rd century, and before his election as Bishop, is especially characterized by the so-called papal crypt, the burial place of the different bishops of the 3 rd century. Pope Damasus, to

## Chapter 3. Location of the most important Catacombs.

### 7. Roman Catacombs.

A Description or even an enumeration of all Christian catacombs cannot be the aim of this book. The Roman communities alone possessed such groups of tombs along all the country roads, that extended from the gates of the Aurelian walls; to these were added the likewise numerous suburban cemeteries, the burial places of the now vanished towns of the Roman Campagna.

Of the Roman catacombs heretofore discovered and made accessible, whose galleries would extend to 547.5 miles if placed together, some certainly extend back in their foundation to the beginning of the second century of our era, and others even into the first. Names having a clear ring in contemporary Roman history are here chiseled in the grave slabs and illustrate in an unexpected way the earliest history of the Christian church.

To the oldest cemeteries of Rome belongs that of Domatilla on Via Ardeatina southwest of Rome. The extremely extensive plan was produced by the union of originally private cemeteries, which were enlarged into a community cemetery. There still stand the ruins of the formerly richly adorned entrance room; particularly beautiful paintings of the first century ornament the corridors; the inscriptions tell of the penetration of the new faith into the family of the emperor, the Flavian family (gens Flavia). The architecturally interesting chamber of Ampliatus (cubiculum), originally a separate family tomb, was later connected with this cemetery.

A brief walk further eastward brings us on the Appian Way, the queen of roads, as antiquity named it from the rich series of tombs. In the midst of mausoleums of the republican and the imperial periods, there mingle here the Christian cemeteries with cells above ground and extensive crypts of even five stories in depth, in the richest combinations. The cemetery of S. Callisto, named from the pope of that name, who had the control of this plan in his hands at the beginning of the 3rd century, and before his election as bishop, is especially characterized by the so-called papal crypt, the burial place of the different bishops of the 3rd century. Pope [illegible]

whom the Catacomb owes numerous restorations, had it richly decorated in the 4 th century(Figs. 11, 12). A chamber (cubiculum), particularly decorated architecturally and by exception entirely constructed of stone and lined with marble, opposite S. Callisto and on the east side of the Appian Way, contains the Cemetery of Praetextatus, in the so-called square crypt (crypta quadrata). While this cemetery yet in great part awaits examination, on the contrary the Catacombs of S. Agnese and the Cemetery Ostianum on Via Nomentina have been entirely cleared of rubbish, as well as in part S. Priscilla on Via Salara nuova, with the graves of the Acilii Glabriones and paintings of the 1 st century (among others, the yet known oldest representation of the Madonna with the Child).[10]

*Note 10. For bibliography and description of the other catacombs see particularly: -- Schultze. V. Die Katakomben. Leipzig. 1882. -- Further; Kraus, F. X. Roma sotteranea. 2 d edit. Freiburg. 1879. Also; Realencyklopädie der christlichen Alterthümer. Freiburg. 1886. -- Lastly; Armellini. M. Gli antichi cimiteri cristiani di Roma e d'Italia. Rome. 1893.*

E. Other Cemeteries.

In structural respects, the other Roman cemeteries heretofore discovered, the catacombs of Naples, those in Sicily, in Alexandria, on Melos (Fig. 13[11]), and at other places differ. The basis of the variation essentially consists in the difference of the material. The harder tufa stone in the hilly ridge of Capodimonte near Naples, the hard limestone of the Achradina of Syracuse, permit quite other dimensions of the subterranean passages and chambers (cubicula), than were possible in the granular tufa of the Roman Campagna. The Catacombs of S. Gennaro at Naples (Fig. 14), extending back into even the 1 st century, and which open directly in two stories over each other according to the slope of the hill, we enter through broad vestibules, from which extend the galleries about 295 ft. long and from 13.1 to 32.8 ft. wide, which are further accompanied by a narrow side gallery in the lower story. The walls of this main passage, like those of the side corridors and the chambers at right angles to it, are abundantly furnished with arched recesses, in contrast to the Roman preference for rect-

whom the Catacomb owes numerous restorations, had it richly decorated in the 4 th century(Figs. 11, 12). A chamber (cubiculum), particularly decorated architecturally and by exception entirely constructed of stone and lined with marble, opposite S. Callisto and on the east side of the Appian Way, contains the Cemetery of Praetextatus, in the so-called square crypt (crypta quadrata). While this cemetery yet in great part awaits examination, on the contrary the Catacombs of S. Agnese and the Cemetery Ostianum on Via Nomentina have been entirely cleared of rubbish, as well as in part S. Priscilla on Via Salara nuova, with the graves of the Acilii Glabriones and paintings of the 1 st century (among others, the yet known oldest representation of the Madonna with the Child).[10]

*Note 10. For bibliography and description of the other catacombs see particularly:-- Schultze. V. Die Katakomben. Leipzig. 1882. -- Further; Kraus, F. X. Roma sotteranea. 2 d edit. Freiburg. 1879. Also; Realencyklopädie der christlichen Alterthümer. Freiburg. 1886. -- Lastly; Armellini. M. Gli antichi cimiteri cristiani di Roma e d'Italia. Rome. 1893.*

E. Other Cemeteries.

In structural respects, the other Roman cemeteries heretofore discovered, the catacombs of Naples, those in Sicily, in Alexandria, on Melos (Fig. 13[11]), and at other places differ. The basis of the variation essentially consists in the difference of the material. The harder tufa stone in the hilly ridge of Capodimonte near Naples, the hard limestone of the Achradina of Syracuse, permit quite other dimensions of the subterranean passages and chambers (cubicula), than were possible in the granular tufa of the Roman Campagna. The Catacombs of S. Gennaro at Naples (Fig. 14), extending back into even the 1 st century, and which open directly in two stories over each other according to the slope of the hill, we enter through broad vestibules, from which extend the galleries about 295 ft. long and from 13.1 to 32.8 ft. wide, which are further accompanied by a narrow side gallery in the lower story. The walls of this main passage, like those of the side corridors and the chambers at right angles to it, are abundantly furnished with arched recesses, in contrast to the Roman preference for rect-

whom the Catacomb owes numerous restorations, had it richly decorated in the 4 th century(Figs. 11, 12). A chamber (cubiculum), particularly decorated architecturally and by exception entirely constructed of stone and lined with marble, opposite S. Callisto and on the east side of the Appian Way, contains the Cemetery of Praetextatus, in the so-called square crypt (crypta quadrata). While this cemetery yet in great part awaits examination, on the contrary the Catacombs of S. Agnese and the Cemetery Ostianum on Via Nomentina have been entirely cleared of rubbish, as well as in part S. Priscilla on Via Salara nuova, with the graves of the Acilii Glabriones and paintings of the 1 st century (among others, the yet known oldest representation of the Madonna with the Child).[10]

*Note 10. For bibliography and description of the other catacombs see particularly: -- Schultze. V. Die Katakomben. Leipzig. 1882. -- Further; Kraus, F. X. Roma sotteranea. 2 d edit. Freiburg. 1879. Also; Realencyklopädie der christlichen Alterthümer. Freiburg. 1886. -- Lastly; Armellini. M. Gli antichi cimiteri cristiani di Roma e d'Italia. Rome. 1893.*

E. Other Cemeteries.

In structural respects, the other Roman cemeteries heretofore discovered, the catacombs of Naples, those in Sicily, in Alexandria, on Melos (Fig. 13[11]), and at other places differ. The basis of the variation essentially consists in the difference of the material. The harder tufa stone in the hilly ridge of Capodimonte near Naples, the hard limestone of the Achradina of Syracuse, permit quite other dimensions of the subterranean passages and chambers (cubicula), than were possible in the granular tufa of the Roman Campagna. The Catacombs of S. Gennaro at Naples (Fig. 14), extending back into even the 1 st century, and which open directly in two stories over each other according to the slope of the hill, we enter through broad vestibules, from which extend the galleries about 295 ft. long and from 13.1 to 32.8 ft. wide, which are further accompanied by a narrow side gallery in the lower story. The walls of this main passage, like those of the side corridors and the chambers at right angles to it, are abundantly furnished with arched recesses, in contrast to the Roman preference for rect-

rectangular recessed tombs.

*Note 11. From Schültze.*

rectangular recessed tombs.

*Note 11. From Schultze.*

rectangular recessed tombs.

*Note 11. From Schultze.*

## Chapter 4. Buildings over the Catacombs.

### 9. Buildings in the Area.

There was scarcely required any special emphasis, that not merely the space underground, but also the surface of the area itself, was utilized for the purpose of the cemetery. After the form of the modern cemetery arrangement were the graves here sunk in the earth; tufa, bricks, or thin slabs of cut stone formed the material of the walls; the floor and covering slabs were made of marble, even pointed-arched coverings sometimes occurring. The requirement of utilizing the space then led to the arrangement of several tombs together, frequently up to ten or more, often in double rows and with vertically set marble slabs to separate the bodies. The inscriptions were found in the interiors of these cells (formae). Fig.15.[12]

*Note 12. After Kraus.*

In other places, stone sarcophaguses, which are usually isolated, were sunk in the earth, so that only the heavy lid projected above the level of the cemetery like a tomb-slab. Tomb-panels of this kind have been made known by the excavations of recent years in Manastirine near Salona in Dalmatia, in Porto Gruaro (Julia Concordia)in Venetian lands, in Syria and elsewhere. Trees shaded these rows of graves; the entire arrangement is probably designated in the inscriptions as a garden.

To a transformation of the architectural expression of the area finally contributed the shrines with four columns (tegulatae), which extended along the inside of the walls enclosing the area, or surrounded other structures standing in the cemetery. These buildings, the mausoleums, cells and basilicas, will be mentioned later; here will the remark suffice, that especially the entaance to the subterranean cemetery, the entrance to the martyrs (introitus ad martyres), was not carefully shielded from the eyes of those of other faiths, but it was usually richly adorned; reference has already been made to an example near the Catacomb of Domitilla.

## B. CHURCH ARCHITECTURE.

### 1. Introductory.

### Chapter 5. Antique Basilicas.

#### 10. Scheme of the Antique Basilica.

The Christian communities of the first centuries, who buried their dead in the previously described sepulchral structures and in the series of art creations to be mentioned, had no less drawn art and especially architecture into their service for their church requirements, as soon as the means were available. As emphasized in the Introduction, since later generations have replaced the works of the early period by later ones, the written sources must speak for the former, and also the circumstance, that about the change from the 3 rd to the 4 th century, a type was fixed everywhere, and by reference to this for the earlier development necessarily preceding the creation of such a type, we are aided in obtaining an idea of this development.

In the houses of the believers and in assembly rooms of many kinds, we find the Christian community gathered for divine service in the apostolic period and yet later; its increase soon made the possession of special church edifices a necessity.

The simple and undivided arrangement of the halls, where the horizontal ceiling extended from one wall to the other without intermediate supports, may have generally sufficed at first; according to the need of more extensive rooms, there was presented a model, naturalized and tested for centuries in the entire Greco-Roman civilized world; the scheme of the basilica, which secular architecture continually employed for the most varied purposes. The antique basilica grew out of a need of public life, as an extension of the forum, the place accessible to every one. "To extend the forum"(ut amplicatur forum), as Cicero once defined the purpose of the basilica,[13] while Vitruvius explains the characteristics distinguishing the basilica from the former, i.e., the covered hall from the open square in the words:-- "to avoid the severity of the weather by transferring the traffic of merchants in winter to the basilicas built on the forum."[14] But the merchants were not the only class, whose needs were served by the halls; first of all the court of justice here required a protected room, isolated

# B. CHURCH ARCHITECTURE.

## 1. Introductory.

### Chapter 5. Antique Basilicas.

#### 10. Scheme of the Antique Basilica.

The Christian communities of the first centuries, who buried their dead in the previously described sepulchral structures and in the series of art creations to be mentioned, had no less drawn art and especially architecture into their service for their church requirements, as soon as the means were available. As emphasized in the Introduction, since later generations have replaced the works of the early period by later ones, the written sources must speak for the former, and also the circumstance, that about the change from the 3 rd to the 4 th century, a type was fixed everywhere, and by reference to this for the earlier development necessarily preceding the creation of such a type, we are aided in obtaining an idea of this development.

In the houses of the believers and in assembly rooms of many kinds, we find the Christian community gathered for divine service in the apostolic period and yet later; its increase soon made the possession of special church edifices a necessity.

The simple and undivided arrangement of the halls, where the horizontal ceiling extended from one wall to the other without intermediate supports, may have generally sufficed at first; according to the need of more extensive rooms, there was presented a model, naturalized and tested for centuries in the entire Greco-Roman civilized world; the scheme of the basilica, which secular architecture continually employed for the most varied purposes. The antique basilica grew out of a need of public life, as an extension of the forum, the place accessible to every one. "To extend the forum"(ut amplicatur forum), as Cicero once defined the purpose of the basilica,[13] while Vitruvius explains the characteristics distinguishing the basilica from the former, i.e., the covered hall from the open square in the words:-- "to avoid the severity of the weather by transferring the traffic of merchants in winter to the basilicas built on the forum."[14] But the merchants were not the only class, whose needs were served by the halls; first of all the court of justice here required a protected room, isolated

# B. CHURCH ARCHITECTURE.

## 1. Introductory.

### Chapter 5. Antique Basilicas.

#### 10. Scheme of the Antique Basilica.

The Christian communities of the first centuries, who buried their dead in the previously described sepulchral structures and in the series of art creations to be mentioned, had no less drawn art and especially architecture into their service for their church requirements, as soon as the means were available. As emphasized in the Introduction, since later generations have replaced the works of the early period by later ones, the written sources must speak for the former, and also the circumstance, that about the change from the 3 rd to the 4 th century, a type was fixed everywhere, and by reference to this for the earlier development necessarily preceding the creation of such a type, we are aided in obtaining an idea of this development.

In the houses of the believers and in assembly rooms of many kinds, we find the Christian community gathered for divine service in the apostolic period and yet later; its increase soon made the possession of special church edifices a necessity.

The simple and undivided arrangement of the halls, where the horizontal ceiling extended from one wall to the other without intermediate supports, may have generally sufficed at first; according to the need of more extensive rooms, there was presented a model, naturalized and tested for centuries in the entire Greco-Roman civilized world; the scheme of the basilica, which secular architecture continually employed for the most varied purposes. The antique basilica grew out of a need of public life, as an extension of the forum, the place accessible to every one. "To extend the forum"(ut amplicatur forum), as Cicero once defined the purpose of the basilica,[13] while Vitruvius explains the characteristics distinguishing the basilica from the former, i.e., the covered hall from the open square in the words:-- "to avoid the severity of the weather by transferring the traffic of merchants in winter to the basilicas built on the forum."[14] But the merchants were not the only class, whose needs were served by the halls; first of all the court of justice here required a protected room, isolated

from the noise of the streets, in the form of an addition attached to one end of the oblong basilica.

*Note 13. Cicero ad Attic. IV. 16.*

*Note 14. Vitruvius de Arch. lib. V, cap. I; ut per hiemem sine molesta tempestatum se conferre in eas (scil. basilicas adjunctas) negotiares possint.*

This apsidal or transverse oblong annex enclosed the raised platform of the tribunal, the places of the judge and his assistants.

*Note 15. After Canina. L. Gli edefizi di Roma antica. Rome. 1849-52.*

*Note 16. After Denkmäler der Kunst. Stuttgart. 1888.*

A direct connection with the principal room was not only unnecessary, but not even advisable; here was the place of judgement, there the exchange and market hall. Therefore the narrow porticos extended around the broad and lofty hall of the latter; the row of columns or of piers was unbroken on the end before the apse of the tribunal. To this side portico was preferably added an upper gallery; sometimes there were two porticos instead of one on each side, and these even extended in galleries around the central space, [17] so that it produced a five-aisled arrangement in plan.

*17. Thus, although hypothetically, are restored the Basilica Ulpia on Trajan's Forum, and also generally the Basilica Julia on the Forum in Rome.*

11. Examples.

This is the basal scheme of the basilica, as Vitruvius (V,1) describes it to us, and the ruins support this in detail. A completely preserved basilica no longer remains before our eyes, and the rules justifying exceptions, for example in the arrangement of the ceiling, i.e., in the omission of the raised portion, do not in themselves require retraction, for example at the Basilica in Pompeii (Figs. 17, 18). Simplification of the purpose of the building, as the transfer of it to traffic, made the addition of the tribunal unnecessary. (Basilica Julia in Rome, Fig. 19 [18]); intimate connection with a religious structure required the addition of a tempel room (Vitruvius' Basilica in Fano); for limited dimensions, there again sufficed the undivided plan of the hall without supports for the

from the noise of the streets, in the form of an addition attached to one end of the oblong basilica.

*Note 13. Cicero ad Attic. IV. 16.*

*Note 14. Vitruvius de Arch. lib. V, cap. I; ut per hiemem sine molesta tempestatum se conferre in eas (scil. basilicas adjunctas) negotiares possint.*

This apsidal or transverse oblong annex enclosed the raised platform of the tribunal, the places of the judge and his assistants.

*Note 15. After Canina. L. Gli edefizi di Roma antica. Rome. 1849-52.*

*Note 16. After Denkmäler der Kunst. Stuttgart. 1888.*

A direct connection with the principal room was not only unnecessary, but not even advisable; here was the place of judgement, there the exchange and market hall. Therefore the narrow porticos extended around the broad and lofty hall of the latter; the row of columns or of piers was unbroken on the end before the apse of the tribunal. To this side portico was preferably added an upper gallery; sometimes there were two porticos instead of one on each side, and these even extended in galleries around the central space,[17] so that it produced a five-aisled arrangement in plan.

*17. Thus, although hypothetically, are restored the Basilica Ulpia on Trajan's Forum, and also generally the Basilica Julia on the Forum in Rome.*

11. Examples.

This is the basal scheme of the basilica, as Vitruvius (V,1) describes it to us, and the ruins support this in detail. A completely preserved basilica no longer remains before our eyes, and the rules justifying exceptions, for example in the arrangement of the ceiling, i.e., in the omission of the raised portion, do not in themselves require retraction, for example at the Basilica in Pompeii (Figs. 17, 18). Simplification of the purpose of the building, as the transfer of it to traffic, made the addition of the tribunal unnecessary. (Basilica Julia in Rome, Fig. 19[18]); intimate connection with a religious structure required the addition of a tempel room (Vitruvius' Basilica in Fano); for limited dimensions, there again sufficed the undivided plan of the hall without supports for the

from the noise of the streets, in the form of an addition attached to one end of the oblong basilica.

*Note 13. Cicero ad Attic. IV. 16.*

*Note 14. Vitruvius de Arch. lib. V, cap. I; ut per hiemem sine molesta tempestatum se conferre in eas (scil. basilicas adjunctas) negotiares possint.*

This apsidal or transverse oblong annex enclosed the raised platform of the tribunal, the places of the judge and his assistants.

*Note 15. After Canina. L. Gli edefizi di Roma antica. Rome. 1849-52.*

*Note 16. After Denkmäler der Kunst. Stuttgart. 1888.*

A direct connection with the principal room was not only unnecessary, but not even advisable; here was the place of judgement, there the exchange and market hall. Therefore the narrow porticos extended around the broad and lofty hall of the latter; the row of columns or of piers was unbroken on the end before the apse of the tribunal. To this side portico was preferably added an upper gallery; sometimes there were two porticos instead of one on each side, and these even extended in galleries around the central space,[17] so that it produced a five-aisled arrangement in plan.

*17. Thus, although hypothetically, are restored the Basilica Ulpia on Trajan's Forum, and also generally the Basilica Julia on the Forum in Rome.*

11. Examples.

This is the basal scheme of the basilica, as Vitruvius (V,1) describes it to us, and the ruins support this in detail. A completely preserved basilica no longer remains before our eyes, and the rules justifying exceptions, for example in the arrangement of the ceiling, i.e., in the omission of the raised portion, do not in themselves require retraction, for example at the Basilica in Pompeii (Figs. 17, 18). Simplification of the purpose of the building, as the transfer of it to traffic, made the addition of the tribunal unnecessary. (Basilica Julia in Rome, Fig. 19[18]); intimate connection with a religious structure required the addition of a tempel room (Vitruvius' Basilica in Fano); for limited dimensions, there again sufficed the undivided plan of the hall without supports for the

ceiling , with the adjoining place for the court.(Timgad in Numidia. Fig. 20.[19])

*Note 16. From Denkmäler der Kunst. Stuttgart. 1888.*

*Note 18. From Hülsen. Ch. Das Romanum. Rome. 1892.*

*Note 19. From Boeswilwald. E. & R. Cagnat. Timgad etc. Paris. 1893.*

Where space permitted this, for convenience of communication with the open area of the forum, one of the longer sides of the basilica was turned toward the latter (Basilica Julia, Emilia, Ulpia, at Rome, Basilica at Timgad); in other cases, the chief entrance must be placed at the end opposite the tribunal (Basilica at Pompeii). The other sides might partly open to the exterior, or be partly built up with rooms at the sides(Basilica Julia in Rome, Basilica at Timgad).

12. Private Basilicas.

Custom and the form naturalized in public life, like the architectural richness of the plan, may have recommended the adoption of these basilican interiors in the palaces of the wealthy and distinguished, like the strikingly similar "Egyptian Oeci". These private basilicas sometimes adorned the richer dwellings (Domus), according to the statements of Vitruvius and others, especially in Rome after the beginning of the splendid imperial period.

Here was the purpose of those rooms, to serve the needs of ceremonials, receptions, and the sittings of courts of justice;[20] therefore the apse with its platform formed an integral part of the interior in a far higher degree, than in the forensic basilicas; here was therefore omitted the mode of separation of the basilica and the tribunal, such as was required in the forensic planu by the extension of the side aisles across the ends. From the so-called concentric subdivision of the interior, there came here a parallel longer subdivision; a wide central aisle is accompanied by one side aisle along each longer side, with or without galleries; the main entrance lies opposite the apse.

*Note 20. Vitruvius. VI. 5.*

Such an interior in basilican form of plan, but not to be restored in elevation with certainty, was possessed by the Palace Flavian (Augustan ?) on the Palatine. Nine columns

ceiling , with the adjoining place for the court.(Timgad in Numidia. Fig. 20.[19])

*Note 16. From Denkmäler der Kunst. Stuttgart. 1888.*

*Note 18. From Hülsen. Ch. Das Romanum. Rome. 1892.*

*Note 19. From Boeswillwald. E. & R. Cagnat. Timgad etc. Paris. 1893.*

Where space permitted this, for convenience of communication with the open area of the forum, one of the longer sides of the basilica was turned toward the latter (Basilica Julia, Emilia, Ulpia, at Rome, Basilica at Timgad); in other cases, the chief entrance must be placed at the end opposite the tribunal (Basilica at Pompeii). The other sides might partly open to the exterior, or be partly built up with rooms at the sides(Basilica Julia in Rome, Basilica at Timgad).

12. Private Basilicas.

Custom and the form naturalized in public life, like the architectural richness of the plan, may have recommended the adoption of these basilican interiors in the palaces of the wealthy and distinguished, like the strikingly similar "Egyptian Oeci". These private basilicas sometimes adorned the richer dwellings (Domus), according to the statements of Vitruvius and others, especially in Rome after the beginning of the splendid imperial period.

Here was the purpose of those rooms, to serve the needs of ceremonials, receptions, and the sittings of courts of justice;[20] therefore the apse with its platform formed an integral part of the interior in a far higher degree, than in the forensic basilicas; here was therefore omitted the mode of separation of the basilica and the tribunal, such as was required in the forensic planu by the extension of the side aisles across the ends. From the so-called concentric subdivision of the interior, there came here a parallel longer subdivision; a wide central aisle is accompanied by one side aisle along each longer side, with or without galleries; the main entrance lies opposite the apse.

*Note 20. Vitruvius. VI. 5.*

Such an interior in basilican form of plan, but not to be restored in elevation with certainty, was possessed by the Palace Flavian (Augustan ?) on the Palatine. Nine columns

ceiling , with the adjoining place for the court.(Timgad in Numidia. Fig. 20.[19])

*Note 16. From Denkmäler der Kunst. Stuttgart. 1888.*

*Note 18. From Hülsen. Ch. Das Romanum. Rome. 1892.*

*Note 19. From Boeswilwald. E. & R. Cagnat. Timgad etc. Paris. 1893.*

Where space permitted this, for convenience of communication with the open area of the forum, one of the longer sides of the basilica was turned toward the latter (Basilica Julia, Emilia, Ulpia, at Rome, Basilica at Timgad); in other cases, the chief entrance must be placed at the end opposite the tribunal (Basilica at Pompeii). The other sides might partly open to the exterior, or be partly built up with rooms at the sides(Basilica Julia in Rome, Basilica at Timgad).

12. Private Basilicas.

Custom and the form naturalized in public life, like the architectural richness of the plan, may have recommended the adoption of these basilican interiors in the palaces of the wealthy and distinguished, like the strikingly similar "Egyptian Oeci". These private basilicas sometimes adorned the richer dwellings (Domus), according to the statements of Vitruvius and others, especially in Rome after the beginning of the splendid imperial period.

Here was the purpose of those rooms, to serve the needs of ceremonials, receptions, and the sittings of courts of justice;[20] therefore the apse with its platform formed an integral part of the interior in a far higher degree, than in the forensic basilicas; here was therefore omitted the mode of separation of the basilica and the tribunal, such as was required in the forensic planu by the extension of the side aisles across the ends. From the so-called concentric subdivision of the interior, there came here a parallel longer subdivision; a wide central aisle is accompanied by one side aisle along each longer side, with or without galleries; the main entrance lies opposite the apse.

*Note 20. Vitruvius. VI. 5.*

Such an interior in basilican form of plan, but not to be restored in elevation with certainty, was possessed by the Palace Flavian (Augustan ?) on the Palatine. Nine columns

on each side, that may well have supported a gallery or upper colonnade, separate a wide central space from two narrow side rooms; opposite the former there opens at one end a great apse with a platform built within it. In its vicinity, marble enclosures extend across the oblong interior (Figs. 21, 22).

The similarity to the later church basilica is clearly apparent. And yet the relation of this to the palace basilica is not that of direct derivation; the latter is not to be designated as the mother of the former, but both are to be regarded as sisters, as in an equal way descendants from the forensic basilica, even if not equally ancient; they are two similar forms of one great species. The fact, that occasionally a transfer of a palace basilica to a Christian community occurred, for example, as shown by the names of the former owners of the palaces frequently adhering to the older churches, is as little found by good authority, as the assertion that sometimes even public basilicas were acquired by the Christians for their religious purposes and utilized therefor; the formerly general view must be decidedly opposed, that the Christian basilica originated in an entirely direct derivation from one or the other kind. Its originators were eclectics, who chose among a rich store of allied buildings the one most nearly corresponding and transformed it into a harmonious whole in adapting it to the requirements of the new religion. The similarity of purpose (reception of a great assembly for the purpose of addressing it, etc.) produced the close architectural relationship, for example, to the palace basilica.

The formerly common statement, opposed from various points of view, that the Christian basilica was derived from certain rooms of the antique house, for example, from the atrium or peristyle (the former view is now represented especially by Dehio and the latter by V. Schultze), cannot be discussed here further without danger to the extent of this half volume. I refer for further information to the analysis in my book, mentioned below.

*Note 21. Kunsthistorische Studien. Tübingen. 1886. Pp. 1-40.*

on each side, that may well have supported a gallery or upper colonnade, separate a wide central space from two narrow side rooms; opposite the former there opens at one end a great apse with a platform built within it. In its vicinity, marble enclosures extend across the oblong interior (Figs. 21, 22).

The similarity to the later church basilica is clearly apparent. And yet the relation of this to the palace basilica is not that of direct derivation; the latter is not to be designated as the mother of the former, but both are to be regarded as sisters, as in an equal way descendants from the forensic basilica, even if not equally ancient; they are two similar forms of one great species. The fact, that occasionally a transfer of a palace basilica to a Christian community occurred, for example, as shown by the names of the former owners of the palaces frequently adhering to the older churches, is as little found by good authority, as the assertion that sometimes even public basilicas were acquired by the Christians for their religious purposes and utilized therefor; the formerly general view must be decidedly opposed, that the Christian basilica originated in an entirely direct derivation from one or the other kind. Its originators were eclectics, who chose among a rich store of allied buildings the one most nearly corresponding and transformed it into a harmonious whole in adapting it to the requirements of the new religion. The similarity of purpose (reception of a great assembly for the purpose of addressing it, etc.) produced the close architectural relationship, for example, to the palace basilica.

The formerly common statement, opposed from various points of view, that the Christian basilica was derived from certain rooms of the antique house, for example, from the atrium or peristyle (the former view is now represented especially by Dehio and the latter by V. Schultze), cannot be discussed here further without danger to the extent of this half volume. I refer for further information to the analysis in my book, mentioned below.

*Note 21. Kunsthistorische Studien. Tübingen. 1886. Pp. 1-40.*

## Chapter 6. Scheme of the Christian Basilica.

### 13. Arrangement of the Christian Basilica.

With all similarity of the basal scheme, Early Christian Architecture was still far removed from all rigid constraint. In the plan, elevation, and in the arrangement, we meet with a rich variety within the same theme. Since it is the purpose of this half volume to represent Early Christian architecture in its characteristic chief forms, and to portray it on a historical basis in its most important representations, so must a purely systematic illustration of its general meaning be omitted, and this must rather appear in its specific forms with a description of the corresponding monuments.

For a purely systematic method of consideration, reference is here made to my book mentioned below[23], wherein I have made the attempt to lay down the chief archaeological base lines of the theme. As introductory to it, a detached description of the following concise elements may therefore suffice.

*Note 23. Die altchristliche Architektur in systematischer Darstellung. Stuttgart. 1888.*

The Christian basilica is divided in two parts in purpose and form; the nave and the presbytery (choir in the mediaeval expression). The presbytery has the form of an apse or exedra, semicircular in plan, in elevation covered by a half dome. It is the place for the clergy, the bishop, the priest and deacons, the sanctuary (sanctuarium), the room closed to the laity (adyton), which from its decoration by a shell already employed in the antique, was also termed the shell (concha), as men were accustomed to transfer to it the appellation of tribunal or tribune, on account of its relationship in form to the annex to the forensic basilica. The apse was also termed the bema, since being elevated by a few steps, it rose above the level of the pavement of the nave. Only later, when the choir of singers found its place here, when at first they stood in the nave, was adopted the name of choir(scil. psallentium), which is now usual. The term altar space (altarium) finally indicated that the altar had its place here on the border between the spaces for the community and the priests.

Three or even five great windows in the wall of the apse afforded abundant admission for light. And the rising sun

## Chapter 6. Scheme of the Christian Basilica.

### 13. Arrangement of the Christian Basilica.

With all similarity of the basal scheme, Early Christian Architecture was still far removed from all rigid constraint. In the plan, elevation, and in the arrangement, we meet with a rich variety within the same theme. Since it is the purpose of this half volume to represent Early Christian architecture in its characteristic chief forms, and to portray it on a historical basis in its most important representations, so must a purely systematic illustration of its general meaning be omitted, and this must rather appear in its specific forms with a description of the corresponding monuments.

For a purely systematic method of consideration, reference is here made to my book mentioned below[23], wherein I have made the attempt to lay down the chief archaeological base lines of the theme. As introductory to it, a detached description of the following concise elements may therefore suffice.

*Note 23. Die altchristliche Architektur in systematischer Darstellung. Stuttgart. 1888.*

The Christian basilica is divided in two parts in purpose and form; the nave and the presbytery (choir in the mediaeval expression). The presbytery has the form of an apse or exedra, semicircular in plan, in elevation covered by a half dome. It is the place for the clergy, the bishop, the priest and deacons, the sanctuary (sanctuarium), the room closed to the laity (adyton), which from its decoration by a shell already employed in the antique, was also termed the shell (concha), as men were accustomed to transfer to it the appellation of tribunal or tribune, on account of its relationship in form to the annex to the forensic basilica. The apse was also termed the bema, since being elevated by a few steps, it rose above the level of the pavement of the nave. Only later, when the choir of singers found its place here, when at first they stood in the nave, was adopted the name of choir(scil. psallentium), which is now usual. The term altar space (altarium) finally indicated that the altar had its place here on the border between the spaces for the community and the priests.

Three or even five great windows in the wall of the apse afforded abundant admission for light. And the rising sun

should shine through the windows of the presbytery, a desire opposed to the practice of antique temple architecture with the entrance doorway turned toward the East, and which already in the 3 rd century led to the rule for the "orientation" of the church. Certainly in the beginning, and even later in consequence of local requirements, the exceptions are almost as numerous as the examples in accordance with the rule.

As a nearly regular extension, there appear beside the apsis at the ends of the side aisles of the nave smaller rectangular or apsidal side rooms (conchulae), one of which served as a sacristy (diaconicon), and the other as a preparation room (prothesis), i.e., for offering and preparing the communion gifts of bread and wine, which were at first presented by the members of the community themselves for the sacrifice of the Lord's Supper. An entrance opening in the entire width of the room distinguished the preparation room (prothesis) from the otherwise similarly shaped sacristy (diaconicon) with its smaller doorway.

The transverse aisle between nave and apse is almost indispensable in the middle ages, but it is known to the Early Christian period only in vanishing exceptions. Its origin is due to the desire for a more dignified and richer treatment of the space for the clergy, as required generally by the apse with its side rooms and the space borrowed from the nave by enclosures.

With the presbytery is contrasted the nave,subdivided by parallel rows of isolated columns into a wider central aisle and two or sometimes even four side aisles. Churches of a single aisle form vanishing exceptions in the multitude of existing monuments; so strong was the habit of the basilica, indeed, that even originally single-aisled buildings adapted from the antique, such as the hall of Palace Sessorian (S. Croce in Gerusalemme) at Rome and others, were at once divided into three aisles by the introduction of columns. Galleries over the side aisles, more coomon for women in the East, with its more rigid practice of the separation of the sexes, only occasionally occurred in the West.

Columns everywhere served as supports for the clearstory walls of the middle aisle, with fex exceptions in the form of piers, their capitals or bases being adorned by a Christian

symbol in the form of a cross or monogram. The horizontal entablature is found but seldom, generally the semicircular arch with rich archivolt, as already in the later Roman secular architecture (Palace Diocletian in Salona, etc.). --- The arrangement of the windows in the clearstory walls of the center aisle was extremely rich; as a rule, a high and broad round-arched window, closed by a perforated marble slab (transenna), corresponded to each intercolumniation of the arcades of the central aisle. Only in later times was glass employed instead of a marble slab, when these numerous windows were frequently walled up, excepting two or three on each side. The primitive condition may frequently be recognized still on the exterior. As examples may serve Ss. Giovanni e Paolo in Rome,(Fig. 23) and S. Apollinare in Classe near Ravenna (See later text).

Likewise have the windows in the walls of the side aisles been usually sacrificed to the later custom of building chapels; the ruins at the East were not affected by later additions and still retain them.

Over the interior extends a horizontal ceiling, mostly paneled and painted in different colors; the visible roof trusses were later the rule, but at first were evidently an exception. The gable roof was covered by tiles and gently inclined, like the shed roofs over the side aisles; hipped roofs were first known to the middle ages.

The main building was at least preceded by a portico, at first frequently by a fore-court surrounded by porticos, the atrium, at the centre of which was to be found a fountain, the Cantharus, often adorned by a roof on columns.

The entrance gateway to the atrium was preferably made of architectural importance as a massive propyleum, on which, according to the words of Eusebius:-- "the eyes of persons of a different faith fell, inducing them to enter on account of the astonishing and wonderful work."

Finally and for especially rich churches, the desire for a complete separation of the main building from all secular surroundings led to the arrangement of an open court (temenos; peribolos) around the entire church, just as often found at antique temples (Temple Apollo in Pompeii, Temple of Venus and Roma in Rome, Temples in Aizani, Baalbec, etc.); porticos enclosed

it, buildings of various kinds, baths, inns, etc. adjoining it.

14. Internal Equipment.

For the equipment of the interior of the basilica, there at first existed no restraining standard; but the requirements of worship soon made indispensable the adoption of certain fixed furniture. Around the semicircle of the apse extended the benches of the priests; in their midst was raised on a step the throne of the bishop. Like these on the longitudinal axis of the building, but brought forward to the front of the presbytery, stands the altar, at first a simple wood or stone table, to which the officiating priest passed directly from the apse, his face being turned toward the congregation. Only when the custom was introduced, of burying the corpses of martyrs in the church, did the altar become a shrine for relics. The change from the table with separate legs to a closed chest my yet be followed on the monuments. When even particles of corpses became prized as relics, a hole cut in the top slab (mensa) of the altar sufficed.

The canopy (ciborium), a roof on columns, between which were stretched costly hangings, frequently rose above the altar, while enclosures (cancelli), sometimes with the addition of a row of columns with connecting entablature and costly decorations, marked the limit of the presbytery toward the part of the nave assigned to the congregation. Likewise enclosed by balustrades, there was frequently a separate place in the centre aisle for the singers (schola cantorum), perforated or sculptured panels being inserted between piers, as yet appear in a mediaeval restoration in Roman churches (Fig. 24[23]). The ambos also found a place here, high marble platforms with enclosure and reading desk, from which were read the Gospels and Epistles, and sermons were later preached, since by increased dimensions of the interior and additional altar decorations, preaching from the throne in the apse was made more difficult.

*Note 23. According to Kraus.*

If in the furniture mentioned, the hand of the sculptor appears very little in works in relief, on the other hand all other decoration of the church interiors was left to the painter, and especially to the mosaicist. The pavement was composed of costly stones of different colors set in linear patterns, in

the style of the so-called opus Alexandrinum, as may still be frequently seen in the mediaeval restorations of Roman churches. Similar patterns also sometimes fill the spandrels between the archivolts of the central aisle, while above in the wide band beneath the windows as well as between and above them, figure compositions found place, sometimes in separate scenes from the Old Testament and New Testament, sometimes in dignified isolated figures or solemn processions of saints.

Richer figure ornament likewise decorates the wall over the arch of the apse, and in churches with transepts, the wall over the broad arched openings to the latter; both arches bore the name of triumphal arch. A prominent place was finally the vault of the apse, from whose golden ground looked down in solemn earnestness the form of the Saviour, surrounded by apostles and saints.

This rich polychromatic impression of the interior was further heightened and elevated by the costly hangings in the arcades, the coffered ceiling gleaming in gold and color, and this must have been entirely dazzling in effect under evening illumination, so lavishly produced by the numerous pendent lamps and candelabra of precious materials, which writers are unwearied in mentioning as the rich gifts of princes and bishops.

15. Exterior.

Far more than the interiors of the still remaining Early Christian buildings of the West did the exteriors suffer later changes. Pompous facades, mostly in the Barocco style, now cover the fronts of the basilicas; the choir has been entirely rebuilt in many cases, and the sides are closely beset by rows of chapels, being so completely concealed by the addition of later structures, that the necessity for architectural ornamentation disappeared. The restoration of the exteriors of Early Christian basilicas is thereby made expressly difficult; yet we are not justified in the frequently asserted erroneous opinion, that the external architecture was entirely neglected in comparison with the splendor of the interior; on the contrary, the statements of contemporary authors expressly emphasize the rich effect of the exterior also. We may therefore assume, that the Roman custom of veneering or plastering

the brick walls of the buildings, which continued in use at first for church buildings as well, until as first shown by the buildings preserved at Ravenna, attempts were made to present the naked brickwork to the eye, but animating it by a slight architectural subdivision (projections, blind arches, horizontal bands, etc.).

But in countries with purely cut stone architecture, we everywhere meet with a treatment of the exteriors of the churches entirely worthy of the interiors.

The preceding briefly characterized general arrangement of Early Christian church architecture first devotes attention to only the numerically predominating group of longitudinal structures (basilicas) in reference to plan and superstructure. It is already emphasized, that besides them, the idea of the central structure appeared early, if even generally reserved more for special purposes (baptisteries, tombs, etc.), yet it was also employed for churches themselves; already in the 4 th century was founded the great Church at Antioch, to mention this alone. But basilican construction was the prevailing kind in the entire domain of the church, and in the East also at the beginning, and its power was so great, that it also drew other plans into its influence, which from their purpose should have fallen in the other group of central structures; the cemetery churches, i.e., the memorial churches built over tombs outside of cities. Only two of the most important, S. Peter in its original form and S. Paul near Rome need be mentioned here, in order to prove the dominating position of the basilica, even at the beginning of the 4 th century.

# II. The Monuments.

## Chapter 7. Western.

### a. Roman Group.

#### 1. Basilicas.

##### 16. Oldest Monuments.

If we seek types of the different variations of basilican architecture, we shall be most quickly satisfied in Rome. The 3-aisled normal type likewise occurred here most commonly; but at the same time, we find here the churches of the early period, that rival the splendid secular buildings of similar design in spaciousness and height; 5-aisled basilicas here exist in the largest dimensions; the rare transepts first appear here and almost exclusively; finally, a motive borrowed from the East, the plan of galleries over the side aisles, is often employed, even if but exceptionally.

A detailed history of the only hypothetically reconstructed buildings, uncertain in regard to their founding and usually with frequent later restorations, is not the aim of this discussion, but it must here suffice to consider what may be certainly recognized and is essential.

At the beginning of the series of the more or less preserved monuments, or of those known from earlier drawings, stand the greatest, the 5-aisled basilicas of the 4 th century.

Tradition ascribes the erection of both the sepulchral churches of S. Peter and of S. Paul, the two chief apostles, as well as of the great Church in the former Palace of the Lateran to the initiative of the emperor Constantine, or of his consort Fausta. In their founding, all three monuments likewise go back to the first decades of the 4 th century, even if the completion of S. Peter's was only accomplished under Constantine's successor, and S. Paul's already had to submit to an extensive rebuilding in 386.

Neither of these churches has remained unchanged until our period. In the rebuilding of the Church of S. Peter, as it was completed under Julius II at the beginning of the 16 th century, only slight fragments of the older monument have remained, and with an entire change of the ground plan and structure, we are here referred to drawings and descriptions of the time for its former construction. Thus in many points, every

attempts at restoration must unfortuaately exhibit considerable omissions or hypotheses.

17. S. Peter at Rome.

The ancient Church of S. Peter belongs in the class of cemetery churches, which were placed outside the city walls of Aurelian, -- only in the 9 th century did Pope Leo IV likewise enclose by walls that part of the city grown up around the Church of the Leonine city, -- and intended to venerate the distinguished tombs, adopted almost exclusively the type of basilica, which had quickly become strongly rooted (Fig. 25). The location of the tomb of the apostle on the eastern slope of the Vatican hill determined the orientation of the Church; the tomb gave the fixed point for the location of the altar, while the hill rising toward the West compelled the extension of the building to the East. To obtain space for the apse and the vast transepts, it was necessary to cut into the hill; the rapidly entering ground water interfered with the building and led Pope Damasus (366 - 384) to collect it and to utilize it in the design of a baptistery.

Adjoining the presbytery was the extended nave, before which lay a great atrium. The walls and rows of columns of the southern side aisle stood on the foundation walls of a former circus, whose location was long indicated by obelisks erected on its dividing wall (spina), and which Sixtus V had transferred only in 1585 to the square before the new Church of S. Peter. Four times 22 columns, fully 23 ft. in height, supported the clearstory walls of the central aisle, 289 ft. long, 75.4 ft. wide and about 98.5 ft. high, and the ceilings of the side aisles. Excepting two of African marble, they partly consisted of granite, partly of Parian marble; like the entablatures, they were the spoils of antique buildings. The columns here in the central aisle were connected by horizontal entablatures about 16.4 ft. high. Horizontal wooden ceilings covered the entire interior; the vaulting of the external side aisles only occurred at a later time (Fig. 26. [24]), evidence of which is also afforded by the painted heads of certain windows and by the Gothic tracery of the facade. The columns of the side aisles are set on high pedestals and are connected by semicircular arches. Since the ceiling of the inner side aisle is

made higher than that of the outer one, the attic of the latter could be lighted by windows in the wall separating the side aisles and over the arcades. -- The frieze over the colonnades of the centre aisle was ornamented on both sides by medallion portraits of Roman bishops; above were the great surfaces of the clearsotry walls, about 65.6 ft. high, against the exterior of which rested the shed roofs of the side aisles, and adorned by other paintings. The mural decorations sketched in representations of the 16 th century, for example, in the Grimaldi manuscripts in Library Barberini at Rome, reproduce only later mural paintings instead of the original mosaics. The springings of the triumphal arch were supported by great Ionic columns with entablature blocks, which were inharmoniously joined to the walls. The multitude of worshipers could pass through all the five aisles of the wide interior without hindrance; the numerous altars, partly oratories ornamented by columnar canopies and enclosures, shown by Alfarano's plan, were only additions in later centuries, a result of the increasing worship of relics; even Charlemagne (800) saw, besides the at first sole altar over the tomb of S. Peter, only three side altars, of which the olerd ones were consecrated by John VII in the beginning of the 7 th century. Under the influence of Byzantine customs, they commenced to ornament the intercolumniations with purple and silken hangings, frequently with representations of figures, more than sixty of which are repeatedly mentioned. Besides the tombs, whose location is doubtful, should also be mentioned the crypt (confessio) as well as the altar and its ornaments.

*Note 24. From Gutensohn & Knapp. Die Basiliken des christlichen Roms. Stuttgart. 1822.*

The former is one of the most complex examples of a tomb over which is built an altar and a church. On account of its low position, it was here impossible to lower the level of the presbytery directly to it, as well as to satisfactorily view and touch the tomb through the openings in the perforated marble slab, elsewhere placed vertically beneath the front side of the altar, here interrupting the steps to the apse. A deeper shaft extended down vertically to the tomb of the apostle; it was twice divided by perforated slabs (cataractae); the

worth of the objects let down was graduated according to their contact with the tomb itself, or with the first or second slab.

Upon the altar itself and its canopy were gold and silver continually employed in almost inconceivable abundance; even the pavement was here covered with silver. And not only balustrades enclosed the space, as usual elsewhere, but six columns with their connecting entablature and rich ornaments elevated the character of this place like the sancturay in the temple; the number of these columns was later doubled, as we see them reproduced in ancient views of the interior of the basilica, for example in the Stanze of the Vatican. At the sides, the transepts received additions, the northern of which was the Baptistery erected by Damasus, while the southern annex led to the small corridor, that connected the church with the Mausoleum of the imperial house of Theodosius, built as a circular structure.

The exterior of the principal building almost disappeared, as to its lower parts, behind the numerous additions of all kinds; only the clearstory with the bronze ornamentation by its roof tiles, taken from the Temple of Venus and Roma by Pope Honorius I, rose high above the surroundings. (Fig. 27[25]).

*Note 25. From Crostarosa, P. Le basiliche cristiane. Rome. 1892.*

Before the eastern end of the basilica lay the atrium, whose depth exceeded its width, contrary to custom. Besides the angle piers, 13 columns rose on each longer side with 13 in each portico at the ends, the Eastern one having been essentially changed in the course of the middle ages by the addition of porticos, a tower, and of loggias. The sloping site required the arrangement of a flight of steps with several landings. The fountain (cantharus) in the middle of the atrium belonged with the most splendid of its kind; in the basin rose the colossal pine cone taken from an antique monument, which now stands in the court of the Vatican named after it (giardino della pigna); the water flowed in cascades down over numerous projections. It was protected by a roof on eight porphyry columns, its edge being ornamented by peacocks and dolphins, of which the former have been preserved. Marble balustrades closed the intercolumniations.

18. S. Paul's at Rome.

In comparison with the Tomb Church of S. Peter, this cemetery basilica is to be termed modest, which rose at the same time over the resting place of S. Paul on the road to Ostia; it was a 3-aisled plan with a western apse and the entrance at the East. First in the year 386, the emperors Valentinian II, Theodosius, and Arcadius, entrusted to Sallustius, prefect of the city, the erection of a new building, that equalled the Church of S. Peter in dimensions or even excelled it, and which was also not inferior in richness of equipment. What Theodosius began, for so runs the mosaic inscription on the triumphal arch, Honorius, his son and successor, completed, and also Galla Placidia, daughter of Honorius, continued the great work with the active assistance of the bishop Leo I, the Great.

As at the resting place of S. Peter, so traveled the mediaeval pilgrims to the tomb of the apostle to the heathens, around which were grouped a monastery with hospices and inns for the travelers. The exposed location South of the walls soon made fortifications a necessity; walls and towers protected the sanctuary, which with its surroundings appeared like a city and received the name of "Johnopolis". The extensive arrangement gradually became ruinous and disappeared excepting the church and monastery, and even the former suffered its fate by fire, which in 1823 destroyed the nave and likewise injured parts of the presbytery. Yet the building was again rebuilt according to the ancient plan, and it today presents the grandest representation of Early Christian basilican architecture, although in modernized execution.(Figs. 28, 29).

The four rows of 20 Corinthian columns in each (the former ones having been fluted, and the present ones being of polished Simplon granite with unfluted shafts) in the nave 394 ft. long and 75.5 ft. high exhibit wider intercolumniations as a result of the arcade connections, than those closely set and spanned by a horizontal entablature in the central aisle of the ancient basilica of S. Peter. Otherwise, both churches were similar in the impression of the interior. A like distribution of the windows and of the painted ornamentation, including the portraits of bishops (saved in great part from

burning of S. Paul's and now preserved in the monastery); the similar support of the triumphal arch by great Ionic columns; also with substantially similar transepts and apse; even here was also the otherwise rare ornamentation by 12 columns in the choir. The arrangement of the crypt (confessio) is nevertheless much simpler at the tomb of S. Paul; of the now doubled canopy, the internal one in Gothic forms belongs to the end of the 13 th century and the larger one above it to very recent years. There are now preserved of the ancient mosaic figures,only the evidently restored figures of the triumphal arch from the time of Galla Placidia with the representation of the Saviour, the symbols of the evangelists, the 24 elders of the apocalypse and the two apostolic princes; the figures of the vault of the apse already belong to the 13 th century.

In the history of the development of the choir, old S. Peter's and S. Paul's without the walls play an important part. Perhaps S. Peter's forms the earliest example of the insertion of transepts between the apse and nave; the direct architectural enclosure of the tomb to be honored and therewith the space for the clergy were then contrasted in equally vast height and width with the lofty nave of the congregation, and no longer were limited to the closely restricted apse. The question, whether the rooms adjoining the transepts on the North and South and extending beyond the width of the nave were original or subsequent additions, is perhaps to be answered in the latter sense. With the rebuilding of the Baptistery of Damasus by Pope Leo III (795 - 816) may have gone on the erection of a similar plan next the mausoleum on the southern side. -- At S. Paul's, the earlier representations do not make clear the architectural history of the transepts; it is striking, that the line of the shed roof is extended over the great walled-up windows of the transepts.

19. The Lateran.

To the two Tomb Churches of the apostles is added the Lateran Church as a third 5-aisled plan. After the thorough changes in the early and last years of the present century, there has remained from the ancient building only the plan of the nave in its general arrangement. (Fig. 30 [26]). The treatment of the interior known from the earlier representations, where

4 rows of partly Ionic and partly Corinthian columns with those in the side aisles on high pedestals, show a uniform connection by arcades, and present the forms of a mediaeval restoration after the fall at the end of the 9 th century. Much of this may be essentially referred to the date of the founding, the beginning of the 4 th century.(Fig. 31 [26]). Tradition names Fausta, the wife of Constantine, as founder of the church, which was erected in the Palace southeast of the city and formerly belonging to the family of the Laterani. How much of this secular building was directly utilized for the church cannot be determined.

*Note 26. From Essenwein.*

*Note 27. From Hübsch, H. Die altchristliche Kirchen etc. Carlsruhe. 1858-63.*

How strongly the practice in Rome varied between the use of the colonnade and the arcade in the interiors of basilicas is shown by a glance at the other existing monuments. These belong without exception to the numerically far greater class of 3-aisled structures. In most is the restoration of the original plan extremely difficult in consequence of the numerous alterations ; we meet in the literature of recent times with the most venturesome hypotheses, usually without any foundation. These monuments in Rome now generally present not much more than entirely isolated constituent parts of the Early Christian period, that have combined in a gay mixture with mediaeval and modern accessories to form a structure, which only in a general way, and often not at all, may recall again the impression of that period of beginning. However important the monuments to the archaeologist, the architect will usually be able to recognize only quite isolated elements, detached from their original combinations, for a general idea of the architectural creations of the Early Christian period.

And since this volume treats of this and not of the special history of the different churches and of gradual changes in their architecture, we must here limit ourselves to a grouping of such characteristic forms of details.

20. S. Maria Maggiore.

In the class of basilicas mentioned with architraves connecting the columns, the first place is next taken by the former

Church S. Peter, now S. Maria Maggiore. The church is externally transformed into the Barocco style, but it still presents in its interior generally a representation of the time of Pope Sixtus III (432 - 440); the original form of the choir is indeed no longer to be established, the interruption of the arcades of the center aisle by two great archways is the work of Pope Sixtus V (1586) and Paul V (1611); the beautiful paneled ceiling finally passes for the work of Giuliano da Sangallo at the end of the 15 th century; among all similar examples, it affords the most faithful idea of the splendor of the paneled ceiling once peculiar to all basilicas, whose gradual decay alone laid open to the view the plain and tasteless roof trusses. (Figs. 32, 33). Among the Roman basilicas, S. Maria Maggiore is now particularly important on account of the preservation of the mosaic decoration on the clearstory walls of the centre aisle and on the triumphal arch. The former presents scenes from the history of the patriarchs, the figures on the arch are devoted to the veneration of S. Maria, whose appellation as Mother of God had just been given at the council of Ephesus, and this became the impulse toward the rebuilding of the church. The 42 Ionic columns of marble from Hymettus, which with 4 granite columns were scarcely wrought new at that time; they were indeed taken from the ancient basilica, which under the name of Sicinian stood here as a secular structure, was later furnished with an apse by Pope Liberius (352) and transformed into a church.

21. S. Maria in Trastavere.

Excepting the later described Church S. Lorenzo, in the other Roman basilicas with horizontal entablatures instead of semicircular arches, the Early Christian origin of the former is no longer to be proved with certainty; greater probability here shows a mediaeval restoration, which is decided on other grounds in several examples. As a proof is here introduced the interior of S. Maria in Trastavere, which was rebuilt anew in 1139, partly with other materials. The earlier structure from the middle of the 4 th century (Basilica Julii) appears to have greatly utilized antique spoils; the diversity of the columns and of the modillions of the cornice on the entablature is in few other monuments so striking as here. (Fig. 28 34).

*Note 28. From Gutensohn & Knapp.*

*Note 29. From Canina, L. Ricerche sull' architettura piu proprta dei templi cristiani, etc. Rome. 1843.*

22. S. Prassede.

S. Prassede may also be mentioned here, although the arches evidently only belong to to the 9 th century (822), which are supported on piers and strong corbels and transversely span the centre aisle(Figs. 35, 36).[28] If the date given for the arches be correct, then in view of the frequently expressed conjecture, that the 6 piers are later than the 16 granite columns, a date of erection for these and their stumpy entablature before the 9 th century would result. The question can only be decided, when the investigation becomes possible, whether the piers are built about columns; the greater probability certainly is expressed by assuming a difference of date in the origins of the columns and the piers; the former being first removed from the corresponding parts, piers being set in their places. -- The form of the plan of the choir exhibits the early mediaeval extension of the choir, widened by transepts; the great distance of the facade and the atrium from the street compels the exceptional arrangement of a long passage, whose doorway was ornamented by a propyleum.

23. S. Sabina.

For the impression of the interiors of the basilicas, the galleries to be next described were not so decisive as the mode of connecting the columns. According to our present knowledge of the monuments, the architrave construction appears to have priority (S. Peter); yet from the imperfect conditions, it is self-evident, that no decision is permissible. In any case, the semicircular arch very soon appeared (S.Paul without-the-Walls, 386), whose connection with columns was not an architectural idea born in church architecture, as among others, numerous examples of secular architecture of the close of the 3 rd century show.(Palace of Diocletian in Salona, etc.). Next to S. Paul in the series of church examples belong first of all S. Sabina and S. Pietro-in-Vincoli, Both pertain to the first half of the 5 th century. S. Sabina was built on the Aventine under Pope Celestin I in 425 by an Illyrian priest

Petrus, as stated by the mosaic inscription on the entrance wall. The proportions of the interior, which is divided into 3 aisles by 24 fluted Corinthian columns of Parian marble, are of satisfactory dimensions.(Figs. 37, 38). The church still retains the original wooden leaves of the doors with their very important reliefs.(Scenes from the Old and New Testaments; Fig. 39).

24. S. Pietro - in Vincoli.

As the columns of S. Sabina were apparently obtained from the Temple of Diana on the Aventine, so are the similar fluted Doric columns in S. Pietro-in-Vincoli said to be the spoils of a destroyed antique building on the Esquiline (Figs. 40, 41). Their bases (plinth and torus) are foreign to the antique and are indeed additions by the church architect. Broad and heavy rest the arches with their triply divided architrave on the abacus, above the circle of the ugly projecting echinus. These forms of supports of the nave may belong to the date of the founding of the church, which Valentinian III's wife established in order to preserve there the chains (vincula) of S. Peter, yet to one of the later restorations , as such occurred under Pelagius I (555 - 560) and Hadrian I (772 - 795), belongs the treatment of the choir, which exhibits vaults in the transepts, and which were later given to the side aisles. Columns and entablatures of the triumphal arch, the latter allied in its simple profile to that in S. Prassede, and recognized even at the first glance as a later and inharmonious adjunct to the arcades of the nave.

25. S. Croce.

Not all the basilicas of Rome were originally new structures. More than one of the later famous churches were made out of secular buildings. Here in particular appeared the power of custom in the rapidly introduced basilican scheme, that men sought to impress upon rooms of other forms at their transformation into churches. In the adoption of halls of a single aisle of moderate dimensions, it was necessary to be satisfied with the addition of an apse and the prefixing of a portico, as shown by the example of the later destroyed S. Andrea in Barbara and yet by S. Balbina.

But if the dimensions of the selected room were large enough,

then two rows of columns were set to produce the longitudinal division into three aisles. This is the interesting process to which was subjected a hall of Palace Sessorian( now S. Croce in Gerusalemme, Figs. 42, 43), apparently in Constantine's time: a similar procedure must also be conjectured in S. Pudenziana. Both churches formerly differed in the admission of light; before the Barocco transformation of the building, S. Croce possessed galleries and no upper clearstory over them, while it is justly conjectured at S. Pudenziana [30], that by the removal of the upper half of the walls of the hall, light was obtained for the windows in the new clearstory over the arcades of the centre aisle. The date of the change fell at the end of the 4 th century.

*Note 30. See Dehio & von Bezold. Die kirchliche Baukunst des Abendlandes, etc. Stuttgart. 1884, etc. P 82.*

More than for the churches within the city walls, the stamp of the Early Christian period has been preserved in the cemetery basilicas over the catacombs. Their great representatives, S. Peter and S. Paul, have already been considered; the ruined basilicas of S. Petronilla, of S. Sylvester, of S. Stephen,(on Via Latina, from the middle of the 5 th century), S. Valentino near Via Flaminia and others, are of archaeological interest in the first degree, on the other hand, there still stand in the Campagna two tomb-churches, that are well preserved and in several respects exhibit exceptional treatment and deserve thorough study. These are the Churches of S. Agnese and of S. Lorenzo. Both were erected directly over the tomb of the corresponding martyr. In order to be able to place the altar directly over this, it was necessary to excavate deeply into the earth, so that only:the upper part of the church edifice projects above ground, while the external walls of the side aisles and a part of the apse were concealed by the adjacent ground. Only later additions have in part created a free space.

26. S. Agnese.

Consider first S. Agnese as the simpler design.(Figs. 44 to 46 [31]). It is a 3-aisled basilica with an apse on the southeast. Among the internal columns, connected by semicircular arches, are found some with fluted shafts. The peculiarity in the structure consists in the arrangement of galleries over the

side aisles. Therefore in order to not omit the direct lighting of the centre aisle, this was carried to a considerable height by the clearstory. Then further a connection of these two side galleries was provided by means of a gallery at the entrance end, by the row of columns required for this transverse gallery, a kind of vestibule was cut off before the centre aisle. The columns of the galleries were inferior in size to the lower ones and are likewise connected by arches, the shafts and capitals varied here likewise; for the smaller diameter of the latter, an impost block was placed on it to support the thick mass of the clearstory wall. -- If the founding of the church is to be referred to the time of Constantine, then should we place the arrangement of the galleries in the time of Pope Honorius (625 - 638), at the earliest, by whom was also the mosaic in the apse.

*Note 31. From Hübsch.*

The date of the first arrangement of galleries in Christian crhurches is now just as little to be fixed, since the reasons that led to the adoption of this architectural feature in the beginning are everywhere still plainly evident. The assumption, that they were assigned to the women during divine service is for the Greek church based on the statements of contemporary writers (Procopius, Paulus Silentiarus and others) and on their names , gynaecea, gynaikonitides; yet it is to be considered, that this also there refers to an exception; no Syrian church is acquainted with this architectural detail; Ravenna, inclined toward Byzantium, exhibits it only once, in a central building.(S. Vitale). For the two Roman examples, it is offered in explanation, that formerly convents were connected with them (when?), and it has been even stated, that the introduction of galleries here fell at a time, when Rome found it expedient to be in a certain indecendence from Constantinople (end of 6 th to beginning of 9 th century; at this time also occurred the building of the afterwards removed galleries in S. Cecilia in Trastavere under Pope Paschal I(817-824 [32])). Perhaps we have to take into consideration for Rome the fact, that with the designs of S. Agnese and S. Lorenzo, deeply sunk into the earth, the need of obtaining space could most easily be satisfied by the arrangement of the galleries.

side aisles. Therefore in order to not omit the direct lighting of the centre aisle, this was carried to a considerable height by the clearstory. Then further a connection of these two side galleries was provided by means of a gallery at the entrance end, by the row of columns required for this transverse gallery, a kind of vestibule was cut off before the centre aisle. The columns of the galleries were inferior in size to the lower ones and are likewise connected by arches, the shafts and capitals varied here likewise; for the smaller diameter of the latter, an impost block was placed on it to support the thick mass of the clearstory wall. -- If the founding of the church is to be referred to the time of Constantine, then should we place the arrangement of the galleries in the time of Pope Honorius (625 - 638), at the earliest, by whom was also the mosaic in the apse.

*Note 31. From Hübsch.*

The date of the first arrangement of galleries in Christian crhurches is now just as little to be fixed, since the reasons that led to the adoption of this architectural feature in the beginning are everywhere still plainly evident. The assumption, that they were assigned to the women during divine service is for the Greek church based on the statements of contemporary writers (Procopius, Paulus Silentiarus and others) and on their names , gynaecea, gynaikonitides; yet it is to be considered, that this also there refers to an exception; no Syrian church is acquainted with this architectural detail; Ravenna, inclined toward Byzantium, exhibits it only once, in a central building.(S. Vitale). For the two Roman examples, it is offered in explanation, that formerly convents were connected with them (when?), and it has been even stated, that the introduction of galleries here fell at a time, when Rome found it expedient to be in a certain indecendence from Constantinople (end of 6 th to beginning of 9 th century; at this time also occurred the building of the afterwards removed galleries in S. Cecilia in Trastavere under Pope Paschal I(817-824[32])). Perhaps we have to take into consideration for Rome the fact, that with the designs of S. Agnese and S. Lorenzo, deeply sunk into the earth, the need of obtaining space could most easily be satisfied by the arrangement of the galleries.

In both churches, this architectural member does not belong to the time of the foundation, but only to a later era of extension.

*Note 32. The galleries in S. Quattro Coronati at Rome first belong to a rebuilding in the 12 th century.*

*Note 33. From Cattaneo, R. L'Architettura in Italia, etc. Venice. 1889.*

27. S. Lorenzo.

Like S. Agnese, S. Lorenzo on the Tiburtine road with full right passes for a foundation of the time of Constantine (Figs. 47, [33] 48). The earlier architectural history of the church is to be followed with tolerable certainty in the inscriptions and epigraphs; I will satisfy myself here by indicating its principal phases. [34]. The basilica of Constantine, built over the area of the Catacomb of Ager Veranus, with a double stairway to the subterranean and richly ornamented tomb of the saint, appears to have given place to a new building by the priest Leopardus at about the end of the century, who followed the usual practice found elsewhere by us and cleared away the church and the surroundings of the tomb of the martyr down to the level of the latter, erecting at this lower level a new basilica. As Sixtus I (432-440) a few decades later considered the accommodation of the ever increasing concourse of the faithful by enlarging the space for worship, he found it impossible to extend the building, deeply sunk in the earth, since according to ancient custom the apse was on the West and the basilica on the East, where the ground ascended so that there was nothing else than to erect a second basilica at the West of the earlier one, so that both apses joined, and the altar of the new church, the larger basilica (basilica major), should be arranged as near as possible to the tomb of the martyr. By means of a perforated slab (transenna) in the wall of the apse, and also by passages in other cases, the connection between the two buildings was arranged. We still have an example of this arrangement remaining from that period in the triple choir (cella trichora) and adjoining basilica of S. Symphorosa on the same Tiburtine road, a few miles further eastward of Rome. (Fig. 49 [35]).

*Note 34. See further in the author's Die altchristliche Architektur, et. Stuttgart. 1888. P. 126, 135.*

*Note 35. From Kraus.*

The next important building epoch for S. Lorenzo occurred,

when Pope Pelagius II (578 - 590) gave to the more deeply sunk eastern church the building of Leopardus, the galleries, and raised correspondingly the clearstory. As the mosaic inscription of the apse once stated, Pelagius carried out an enlargement of the church; this has been understood as a slight lengthening of the building, and also the ornamental addition, built with antique spoils, of an entablature above the beautiful lower Corinthian columns is counted as the work of Pelagius. (Fig. 50). Be this as it may, the upper arcades show themselves by the rude imposts and certain painful and hard imitations of Corinthian capitals, that find their like in that time, to be the work of just that period of the closing 6 th century. (Fig. 41[36]). The later fate of the church can only be touched upon here. Its present and united existing internal appearance is due to the transformation by Pope Honorius III (1216 - 1227), who removed the two joined apses and the nave of the western basilica so as to lengthen the eastern, the new columns placed then are characterized by more slender shafts. The Eastern building was now deprived of its character as an independent structure and was transformed into the choir of the new entire building, when for about two-thirds of the height of the lower colonnade, a new pavement was introduced, raised several steps above the western structure, and which now supports the seats of the priests and the altar with its canopy. (ciborium). The side aisles and galleries afterwards lost their importance.

*Note 36. From Gutensohn & Knapp. -- If it be said of Pelagius, that he removed the darkness, it can only refer to this; that he admitted light by raising the church previously sunk deeply in the ground, so that the inscription might further state; "thus light is in the former darkness."*

*Note 37. From Centralblatt der Bauwesen. 1885. P. 447.*

2. Roman Central Buildings.

The variety of central plans in Early Christian architecture has already been mentioned in Art. 15. While after the epoch of Justinian, the East begins to employ the central plan in connection with domical and vaulted architecture for all church buildings, the Roman church from the beginning, if not quite exclusively, reserved it for the two classes of baptismal and tomb churches, to which were added memorial structures. Rome

itself presents certain existing examples of them. From the group of tomb buildings in central form, already given as illustrations of the cemetery cells (trichorae) in Art. 9, we have even of the period before Constantine, S. Sotere, Ss Sisto e Cecilia, over the Catacomb of Calixtus, as well as the allied design of S. Simforosa.(See Art. 27). The dimensions of all these buildings are very modest. From the construction of the brick masonry, they might still belong to the 3 rd century. The central square covered by a dome is adjoined on three sides by apses; the fourth side either remains open, perhaps originally with the setting of two columns and a marble balustrade, or there was added a vestibule (of trapezoidal form at S. Simforosa).

29. Undivided Plans.

With respect to the architectural history od the development of the forms, among other central plans, the simple, undivided rotunda is to be placed first, , in which Early Christian architecture certainly repeated or varied creations of earlier periods, among which the Pantheon forms the climax. In this series belongs the Mausoleum of the empsess Helena on Via Labicana, called Torre Pignattura from the use of hollow clay pots for making the dome lighter, a rotunda with eight niches recessed in the wall in the still remaining lower parts, simply the circular structures of S. Andrea and S. Petronilla, formerly existing near S. Peter's, the Mausoleum of the imperial family of Theodosius, whose interiors were subdivided into great niches for the reception of the sarcophagus.(Figs. 25,27).

Since beside the undivided hall appeared the basilica with several aisles, , so was now placed beside the simple domed interior the sobdivided circular structure. To animate by niches the massive wall beneath the triumphal dome had already been undertaken in the time of Hadrian at the rebuilding of the Pantheon.(Fig. 52). A century later, we see in the domed hall of the Baths of Caracalla these niches changed into vaulted passages, in another hall of the baths, the so-called Temple of Minerva Medica, the broad passages from the (here decagonal) central space are arranged as niches. (Fig. 53).

30. S. Costanza.

But a united treatment of the whole could only result, when

an unbroken annular passage was carried around the central space, thus producing a perfectly concentric subdivision of t the building. So far as we can judge from the original monuments, this step was first taken by a master of the time of Constantine, the builder of the Mausoleum intended to receive the sarcophagus of Constantina, daughter of Constantine, who died in 354, and of her sister Constantia; Helena, wife of Julina the Apostate, also found here her resting place. It is the circular structure now known as S. Costanza, near the Cemetery Basilica of S. Agnese on Via Nomentina, mentioned in Art. 26.(Figs. 54 - 58[38, 39]). An annular ambulatory surrounds the circular higher central space. Twelve pairs of coupled granite columns with varying capitals, partly Corinthian and partly Composite, are connected by arches and support the hemispherical dome above a high drum. With the somewhat wider intercolumniations on the two principal axes, these arches are of wider span and higher rise, the outer edge of the soffit is higher than the inner one in all cases. The high drum, against whose lower portion abut the annular vault and the roof of the ambulatory, is pierced by 12 round arched windows in its upper part. Whether an opening existed at the crown of the dome is uncertain. The building formerly had no other means of admitting light, excepting the two windows in the raised portion over the aisle and opposite the entrance. The small openings in the annular vault were roughly cut later, as shown by their interruption of the mosaic patterns of the vault. The outer wall of the aisle is subdivided by 12 smaller niches , alternately rectangular and semicircular, and 4 larger ones, only the eastern one of which originally contained an entrance; before it lies a portico with two niches at the sides. The passage around the building, gradually leading downwards in a ramp, is perhaps to be restored as an annular portico of columns. Unfortunately, the rich internal decoration up to the mosaics of the vault of the aisle has fallen a sacrifice to modern restorations. The ornamentation of the dome is only slightly given in the sketches of Francisco d' Olanda in the Escurial, partly published by Garucci. (From the 16 th century). It is questionable,whether specific Christian forms have been mixed with the antique sepulchral and symbolical representations. (Figs.

(Figs. 57, 58); Mariano Armellini has recently discovered again evident vestiges of the monogram of Christ once seen in the principal niche by Uganio.

*Note 38. From Dehio & von Bezold.*

*Note 39. From Garucci.*

31. S. Stefano Rotondo.

In the class of memorial churches allied to tomb churches, we perhaps have to place another Early Christian monument at Rome, the Church S. Stefano Rotondo on the Caelian. From the history of the noteworthy structure, we have only a few dates, of little importance to the history of architecture. According to a statement in the Liber Pontificalis, Pope Simplicius (468 - 482) commenced the church, and former inscriptions, copied even in the 9 th century, mentioned the rich marble veneering and mosaic ornamentation by Popes John I (523) and Felix IV (526 - 530), the latter of these also decorating the "forum of the church", i.e., the precinct. In the time of Hadrian I (772 - 795), the church required repairs internally and externally, and it received beams of great size. In the course of the middle ages it again became ruinous, so that at the beginning of the 15 th century, Flavio Bondo found it robbed of its roof over the middle portion, even if the rich ornament of the walls still charmed Giovanni Rucellai in 1450. Restored three years later by Nicholas V, according to the existing inscription, although he considerably injured the building, according to the words of Francesco di Giorgio, by reducing its extent indeed, which he limited to the condition still visible today. (Fig. 59 [40]). The present enclosing wall of the aisle around the central circle is the work of Nicholas V; he permitted here the second circle of columns to be walled up to 9 intercolumniations (in different places), and the original external walls of the concentrically subdivided circular building were torn down. They are easily prominent in their present condition, besides the late portico before the present entrance, as not original portions of both high columns of the central circle with their arches and the corresponding piers, which stand in place of columns in the columnar arcade (Fig. 60 [41]); we have to recognize in them an addition by Hadrian I, who made them a support for his great beam ceiling. Somewhat earlier

is dated the little eastern apse in the former enclosing wall, now remaining only in fragments; it is a work of Pope Theodore I (642 - 649). After the discovery of the remains of the original design, which were retained in the reduced building of Nicholas V, the oldest structure may be restored in the manner shown in Fig. 59, although indeed merely hypothetical. Worthy of note is the accenting of two axes intersecting at right angles, which are marked in the second row of columns by the insertion of two piers each and a greater height of the four columns standing between these, while behind them are four spaces, bordered at the sides by radial rows of columns, and which have greater depth and height also, than the four compartments of the outer aisle lying between them. The external walls of these four larger spaces in the axes are arranged concentrically with the interior and are then extended around the entire building, so that the four narrow courts, which are already enclosed on these sides by the outer walls of the outer row of columns and the radial walls at the sides of the projecting rooms on the axes, and they are also externally enclosed. The number and location of the doorways leading from the exterior to these courts is only certain at two places. Fig. 61[42] shows the restoration of the exterior attempted by Hübsch, but from which the apses and mosaic decoration are to be omitted.

*Note 40. From Cattaneo.*

*Note 41. From Kraus.*

*Note 42. From Hübsch.*

As in the restoration of the plan, there mingles with the former structure many questions. The 22 granite columns of the inner circle show themselves to be antique spoils by differences in the diameters of their unfluted shafts as in their bases and Ionic capitals. They support a horizontal entablature, while the columns of the second row are connected by round arches and vary from them by the addition of impost blocks, of which those on the larger columns in the principal axes are ornamented by the cross. Over the middle series of columns rises a drum of imposing height, in its upper half and above the junction of the shed roof of the outer aisle, it is pierced by a series of 22 high and wide windows, now in part

walled up. Above all spaces extends a horizontal entablature. What portion of this structure belongs to the design of the period of the founding and what to later changes? The question is hard to decide, like another, whether the arrangement of the plan of the building is based upon an antique secular design. We do not need an affirmative reply to this latter in order to explain the singular form of plan for a church building. Even if the West presents us with no analogies now, it possessed them, and those of the East are shown partly in ruins; these are the memorial churches of Palestine and Syria, among which we shall here refer only to the nearest example, the building at the place of the death of the protomartyr Stephen near Jerusalem. Whether therefore a direct relation existed between it and the Roman Church of S. Stephen, as recently hypothetically indicated by Dehio, in reference to an apparent founding of the latter by Placidia, a niece of the Eudoxia that erected the memorial building near Jerusalem, may be uncertain. Essenwein expressed the conjecture, that the middle aisle may perhaps have been uncovered at first. To this is opposed first, that here in Rome not a real memorial building is concerned, like that in Jerusalem, but merely an imitation, in which the vacant and roofless central space would be meaningless and senseless; the congregation did not gather here for the memorial celebration at a tomb or a place consecrated by any other event in the history of the martyr; here it could only avail to erect a building, which in its general form corresponded to that sanctuary in Palestine. And then, if the high drum and roof were not built in the time of Simplicius, this innovation might first fall in the epoch of Hadrian I; the Papal Book, which scrupulously records the restoration and decoration under John I and Felix IV, would not have silently passed over such a decided alteration. And is it finally to be believed, that Hadrian should have so strongly influenced the effect of the great drum from the first, as in his first design, by placing columns and arches in the midst? But aside from this, the architectural knowledge and invention of the period of Hadrian I was in general no longer sufficient for such a vast central building.

32. Lateran Baptistery.

We find ourselves in a similar uncertainty in regard to the former conditions, as at S. Stefano Rotondo, in the third of the Early Christian central buildings in Rome, the Baptistery of the Lateran.(Figs. 62, 63 [43]). The tradition of the founding of this by Sylvester I, to whom tradition assigns the baptism of Constantine here, may be left to itself; more certain is the story of the rebuilding under Sixtus III (432 - 440). If in the succeeding period the changes in this building were not so thorough as in the neighboring basilica (see Art. 19), yet little enough has come to us on its original form. The structure was indeed an octagon from the beginning, before which on the South was placed a vestibule, which opened externally by a columnar porch (two porphyry columns with horizontal entablature), now walled up, and extending at the sides into two apses, one of which was later changed into an oratory of Ss. Rufina and Secunda, that still retains the mosaics of the vault from the 4 th century. To the octagon of the principal space correspond in the interior a circle of eight columns with the entablature resting thereon. The columns have porphyry shafts with different Ionic, Corinthian and Composite marble capitals. The space inside the columns is entirely occupied by the sunken font, now decorated in the Barocco style, the great basin into which the converts descended unclothed for complete immersion. It was formerly of porphyry and silvered (perhaps on the balustrade); a porphyry column rose in the centre as the support of a vase for burning incense. From a golden lamb and seven silver stags, the water poured into the basin, on whose balustrade stood silver statues of Christ and of John the Baptist, five feet in height. Only the eight porphyry columns at the angles of the basin remain with their entablature; they were a gift of Sixtus III, whose eight distichs inscribed on the entablatures likewise exist in a restored form; perhaps this colonnade was not originally added as a mere ornament, but also for practical purposes, in order to be able to stretch the curtains, which used to conceal the interior of the basin during the baptism.

*Note 43. From Dehio and Von Bezold.*

Concerning the original elevation of the entire interior, we

are entirely in the dark. The idea of an originally uncovered central space is to be rejected in view of its treatment here. A covering by a vault is not to be thought of by reason of the external walls. A later view of the interior (in an engraving of the 17 th century) shows us a vault over the aisle, intersected by the cross vaults of eight round arches over the intercolumniations. These arches extend between short piers, which relieve the entablatures above the lower columns, and support in their lower portion a dome with widdows. To what period this or any similar design belongs is entirely uncertain. A later period replaced the arches by a second and smaller series of columns with an entablature, and built above them a wooden dome.

The small oratory added to the Baptistery by Pope Hilarus (461-468) and others shows in part the form of the Greek c cross with short arms and tunnel vaults; in one of these additions, S. Giovanni Evangelista, the vault is still decorated by the mosaic ornamentation of the 5 th century.(Fig.64[44]).

*Note 44. From Garucci.*

b. Ravenna.

1. Basilicas.

33. Architecture of Ravenna.

To the Early Christian monuments of Rome would incorrectly be contrasted the general group of buildings at Ravenna as something essentially differing from them. The difference in reality lies only in subordinate matters, so long as specifically Byzantine influences do not make themselves felt in Ravenna.(After the middle of the 6 th century). It is certainly based on a defective knowledge of the general idea of Early Christian architecture, if for example, one represents as peculiar to Ravenna the connection of columns by arches instead of a horizontal entablature, or the arrangement of two side apses next the choir, or refuses the atrium to the churches of Ravenna. Neither in the arrangement of plan nor in the construction of the monuments does Ravenna differ from Rome and other places; only in certain things, particularly in the execution of the ornamentation, like the forms of certain capitals of columns, and likewise borrowed from the East, like the Prokonesian marble as material for the columns, a prefer-

preference for a polygonal enclosure of the apse, and finally in the cylindrical forms of the towers, Ravenna presents differing tendencies in the general representation of Western church architecture. The treatment of the brick walls by projecting bands and arches is not peculiar to Ravenna; Rome offers allied examples.

The central plans of Ravenna are joined to the series of octagonal buildings borrowed from the antique; only S. Vitale is an important link in the chain of experiments for solving the problem of connecting the central domed building with galleries. Finally, two mausoleums (Tombs of Galla Placidia and of Theodoric) are interesting in themselves, but are of no consequence for the further development of church architecture.

About at the change from the 4 th to the 5 th century, Ravenna enters the history of Christian architecture. A political event, the location of the seat of the Western Roman empire in the city surrounded by swamps, more easily defended against the attacks of Northern barbarians, and near the station of the fellt at Adria, strongly influenced the architectural development of the ancient episcopal seat, which had been previously satisfied with poor places of worship, lacking all beauty. The varying fortunes of the succeeding centuries did not check the artistic development of the city; rather did just the change in the monarchy, which passed from Western Rome to Odoacer, Prince of Herulians, then to Theodoric, King of Ostrogoths, and again from him to Byzantium, new and imposing monuments were continually added to the city. Only when northern and Italian princes and cities (Charlemagne, Sigismond Malatesta, and Venice) seized on the splendid materials of Ravenna as plunder, one touch after another began to fade in the magnificent picture; the period of bloom and of maturity was succeeded by the sleep of winter; as in a dream is the traveler now surrounded by the view of the quiet and monotonous city with the gray evidences of a splendid past, when Ravenna's bishops thought themselves equal to the successors of S. Peter.

Ravenna shared with Rome the fate, that the chief examples of the splendor of church architecture were sacrificed to later rebuilding, or as in the harbor city of Classis, entirely

vanished from earth as if the waves of the adjacent sea had passed over them; only one building, the former resting place of S. Apollinaris, has remained standing; of the finest creations, the Church of S. Peter and its Baptistery, as well as of all other monuments, we have still only slight written knowledge.

34. Basilica Ursiana.

The Basilica of S. Apolinaris in Classis belongs to the latest foundations of the Early Christian period; the monuments in Rome itself go back from it to S. Vitale. Even in the time of Honorius, there arose by the care of bishop Ursus the principal church of the city, named after him later the Basilica Ursiana, dedicated to the Resurrection (Anastasis). The great 5-aisled building fell a sacrifice to an entire modernization in the last century; its plan has only been preserved in a superficial sketch (Fig. 65)[45]), and only quite isolated portions of its interior were taken into the rebuilt structure, like two syenite columns of its central aisle, or the two columns of Greek marble, that formerly supported the triumphal arch. The space for a second altar in the centre aisle was enclosed by balustrades; beneath the present choir is still found the crypt of circular form, recently inaccessible on account of water in the ground, and whose ceiling rests on columns of varied forms. Its age is indeterminate and scarcely extends beyond the 8 th or 9 th century.

*Note 45. From Seroux d'Agincourt. Histoire de l'Art par les Monuments, etc. Paris. 1810-1823.*

Of the ornamental ambo, the marble reading desk elevated on steps, only the middle portion with its convex surfaces remains, on which appear Christian symbols in numerous panels.

Likewise a singular example, not of a marble throne fixed to the seats around the apse (subsellias), but of a free wooden chair with rich carved ornaments in ivory, is preserved in the Cathedral, according to the monogram on the front a work of the time of bishop Maximian (546-556), who appears in the mosaics of S. Vitale among the attendants of Justinian. The same emperor had assigned to the predecessor of Maximian, bishop Victor (539-546) the entire year's income from the taxes of Italy, to replace the ancient wooden canopy over the

altar by a new one of silver weighing 2000 lbs.; it was carried away in 1512 by the French.

*Note 46. From Nothes. Die Baukunst des Mittelalters in Italien, etc. Jena. 1882-1884.*

**35.** S. Apollinare Nuovo.

Since the Cathedral of Ravenna has completely changed its form, the two churches of S. Apollinaris present the most faithful representation of the art of the Early Christian period. S. Apollinare in Classe was built in the period of Justinian, S. Apollinare Nuovo first received the body and name of the saint in the 9 th century, yet this church is the older building, at first consecrated in the name of S. Martin with the addition of "in the golden sky" (In coelo aureo), which it received from the decoration of the gilded ceiling.(Figs. 66 to 68). Theodoric was the founder of the church; after the end of the Gothic monarchy, the Arian basilica was given up to the Catholics by bishop Agnellus (553-566). The artistic form of the monument was not affected by this change; the mosaic ornamentation of the interior also remained unchanged and was completed by Agnellus. The building suffered injury in the time of John VI (613-630) by the fall of the apse, which was later entirely rebuilt in the 16 th century. Likewise the northern side aisle has been extended by chapels of different periods and of varied forms; the atrium has lost its porticos, except one in part mondernized; a great coupled window was cut out in the facade wall, while the openings of the cylindrical bell tower were partly walled up; finally, at the beginning of the 16 th century, the entire church was placed on a higher level, with the careful preservation of the arcades and clearstory walls; a later gradual elevation of the adjacent soil then made necessary the introduction of a new and somewhat higher pavement, whereby the bases of the columns were covered.(Those now visible are merely sham additions). Thus the church has certainly setained from the earlier period the centre aisle as a whole. Twelve unfluted columns in each row with similar Byzantine capitals and impost blocks support the arches, whose soffits were paneled in the 16 th century; the medallions in the spandrels were also added then. The mosaic ornamentation of the broad band between the arches and windows, processions

of male (southern) and female (northern) martyrs, comes from the time of Agnellus and is perhaps to be regarded as replacing the older Arian figures of the period of Theoderic; there stand above these 15 colossal separate figures on each side, between the windows, which lie above the intercolumniations of the arcade, except at the beginning and end; dignified and earnest men with manuscript rolls or books in their hands; a shell ornament above their heads gives to them a niche-like enclosure together with the side architraves of the windows. Above the windows themselves, smaller oblong mosaics with representations of the life of Christ have found places. Thus a rich system of picturesque ornamentation of the interior has here remained to us, the view of which makes severely felt the loss of the figures of the choir, which formerly completed the series.

*Note 47. From Ricci. Ravennae i fuoi contorni. Ravenna. 1853.*

If a thorough consideration of the interesting signification of these mosaics must be omitted here, yet two details thereof also claim a place in this volume, in so far as they illustrate architectural sketches. The two well known series of holy men and women, who move toward the throne of Christ and of the Madonna, proceed from places designated by inscriptions. The series of martyrs on the right side comes out of the city of Ravenna.(fig. 67). Above a round-arched gateway with battlements and flanked by towers, the inscription "Civitas Ravenn(a)" (City of Ravenna) gives the locality, which is but summarily represented by a few structures. The entire foreground at the left of the gate is occupied by a rich building, designated by the inscription "Palatium" (Palace) as the royal residence of the Gothic king, and which perhaps reproduces one of the facades, perhaps also a side of the palace next the court. It opens with an arcade of columns; rich tapestries hang in the intercolumniations by rings on iron rods and are gathered up at the lower ends. The three middle ones exceed in width and height the three at the sides; a gable combines them into a great portal group. The side arcades support an upper story with smaller columnar galleries; victories appear in the spandrels of the arcade. How far this representation corresponded

to the reality cannot be decided; Theodoric's palace has disappeared, and the brick structure now standing near S. Apollinare , withe the tasteless enclosure of the portal, the rectangular niche and the columns supporting corbels, is indeed a later work, or at least in view of the great difference in the height of the sill of its portal and of the former pavement of the church near by, was modified in the succeeding period.[48] In the mosaic and behing the roofs of the palace are visible basilicas and circular buildings, as well as the battlements of the city wall; perhaps we may see in the buildings on the right side S. Apollinare Nuovo (S. Martino) and the Baptistery formerly beside it, in those on the left S. Spirito and its Baptistery Church (S. Maria in Cosmedin), the churches erected by the Gothic king. It is remarkable that the tower of S. Apollinare is wanting. (See Art. 36).

*Note 48. A great part of the rich decorative equipment of the Palace in marble and mosaics, together with the equestrian statue of Theodoric, was carried off by Charlemagne for decorating his residence city of Aix-la-Chapelle; remains of rich mosaic pavements were found only a few years since in the adjacent garden of the Monghini. The king prized his work as an ornament of his kingdom, a speaking evidence of his power, and whose wonderful beauty aroused the astonishment of foreign ambassadors. (Cassiodorus. Var. VII. 5).*

Opposite the representation of the palace, the mosaics of the left side of the centre aisle show the procession of holy women as leaving the harbor city of Classis. Gateway and walls are similar to those of Ravenna; two larger rectangular towers flank the entrance to the harbor; between them the eye beholds the sea animated by ships. The architectural character of the buildings within the walls is different from those of Ravenna; secular architecture prevails here in Classis; an amphitheatre, an acqueduct, and others are especially prominent.

36. S. Apollinare in Classe.

Of all buildings in Classis, there has alone been preserved the Basilica of S. Apollinare. It is one of the latest in the series of Early Christian monuments of the city. Bishop Ursicinus (535-538) had it built by Julianus Argentarius; but his successor Maximian first consecrated it in 549. Fully 1.64 ft.,

below the present surface are now concealed the foundations of the former atrium (Fig. 70 [47]); only the eastern portico thereof is walled up as a closed narthex (ardica, according to ancient Ravenna dialect), and is standing today (Fig. 69); of the two side wings, the southern was torn down several years since, the northern lost its formerly open pier arcades by their being wallep up. Three doorways (the southern is now walled up) lead from the vestiblue into the 3-aisled interior (Fig. 71), which formerly opened directly to the exterior through 6 wider doorways in the side aisles. Twice twelve columns here support on arches the clearstory walls, whose windows formerly corresponded in number to the intercolumniations, but are now walled up, except two on each side. A triple window is ornamented by two columns and admitted light through the upper wall of the facade, and finally the two side aisles were finished with the same number of windows, as each clearstory wall of the centre aisle.

The columns of veined Hymettus marble are notable in every respect. Above a pedestal with lozenge-shaped ornament, they exhibit a weak base and an ugly annular enlargement at the coves of the shaft. The Composite capitals (Figs. 72, 73) show that serrated form of leaf with ribs indicated by drill holes and deep undercuts, similarly to the columns on the market-place of Ravenna adorned with the monogram of Theodoric, which once belonged to the public Basilica of Hercules (Fig. 74). An impost block diminished downwards and with the cross occupies the broad springing of the arch. The height of the columns amounts to 15.3 ft. and their diameter to 2.2 ft. --- The mosaic ornamentation of the centre aisle long since disappeared; late medallion portraits of bishops of Ravenna extend above the arcades and continue in the side aisles, as in S. Paul near Rome. The rich marble veneering here was carried off in 1450 by Sigismond Malatesta for the decoration of S. Francesco in Rimini. The marble pavement with its opus Alexandrinum has likewise vanished, as well as the richly paneled ceiling ornamented by stars on a blue ground, which was again restored at the beginning of the 9 th century by a master Chrysaphinus of Rome.

Only the apse still retains its ancient ornamentation. It is

in Byzantine form and externally polygonal (five-sided); to each side corresponds a high and wide window. Twelve steps of a stairway, restored in the last century and curved in Barocco form, lead for the entire width of the centre aisle up to the choir; at the sides of this lie the entrances to the passages extending around the semicircular wall of the apse, (Fig. 75), from which a returning branch in the central axis of the building leads to the tomb of the saint beneath the altar, a precursor of the later spacious crypt, whose analogues are also found in Rome.(S. Prassede, S. Pancrazio). The exact date of the first is not assured by any of the known examples or further by one enlarged by a semicircular row of columns.(Cathredral of Ravenna; see Art. 33; S. Francesco there)[49]

*Note 49. See the author's frequently mentioned book; p. 128.*

A representation of the mosaic ornamentation of the choir is given by Fig. 76[50]; the side arms of the former episcopal chair of Damianus (688-705) now form the ends of the bench for the priests; the columns of the tabernacle erected in the beginning of the last century are from the altar canopy of bishop **Dominicus** (889-898), which itself replaced one of silver. A faithful idea of the form of the ancient canopy is afforded by the structure over the altar at the end of the left side aisle, from the close of the 9 th century; a pyramid is to be conceived as the upper termination in accordance with the analogy of other monuments.(Fig. 77).

*Note 50. From Garucci.*

The exterior of the church deserves consideration. The brick construction is here visible everywhere, and it was manifestly intended for its even effect from the beginning, without material assistance from stucco, painting or mosaic. Projections with simple capitals composed of projecting courses of bricks rise between the windows as supporters of the great round arches; a simply and clearly shaped cornice terminates the wall.(Fig. 78). --- For comparison, we here add some like details from Roman churches, for which the date of execution is indeed not to be determined.(Figs. 79 to 83[51]). A Different motive appears in the frieze on the lower portion of the bell tower.(Fig. 84). The age of the latter, whose detached position beside the basilica (Fig. 85[52]) and cylindrical

form is also found in Ravenna at S. Apollinare Nuovo as well as at the Cathedral, is not to be determined; likewise the conjectures concerning the reasons for adding the towers to the church have so far shown no motive therefor. We are satisfied to show the difference in the formal treatment existing between Ravenna and Rome; for the Roman towers (Fig. 87), the square is always taken as a basal form, and numerous stories are indicated by string courses decorated by consoles, in which are arranged and increasing upwards, single, double, and triple windows.

*Note 51. From Hübsch and Mothes.*

*Note 52. From Hübsch.*

2. Central Buildings.

The most important of the central buildings of Ravenna, S. Vitale, as indicated in Art. 33, has to take its place in the series of Byzantine buildings to be described later; it is here sufficient to include the other and smaller central designs at Ravenna. Two of these are baptisteries, two others belong to the class of tombs. Of the baptisteries, one, S. Giovanni in Fonte (orthodox, as distinguished from the Baptistery of the Arians), rises beside the Cathedral. It is an octagonal structure (Figs. 88 to 90); one side contains the entrance; four are extended by apses in the lower part; round-arched windows are placed in the upper part of each wall; blind niches rest on columns set in the angles and enclose the walls above and below; over them rises the spherical dome. The peculiar construction of this work by means of the lightest possible materials is evident from Figs. 91 and 92. It is the already sometimes ocurring the construction found in the later antique period (for example, on the Circus of Maxentius near Rome), the common use in Ravenna of long clay vessels, pointed below and spirally ribbed on the external surface, which rise spirally from the base to the crown of the dome in double layers and possess an extremely light weight. To the mortar covering the lower surface of the dome adheres the mosaic reproduced in Fig. 95 [53], which has the representation of the baptism of Christ and the twelve apostles besides the fourfold representation of the church among the figures of the altar with the book of the

gospels and the veiled throne of God. Altar table as well as the throne stand in columnar structures adorned by apses, whose principal lines fit without constraint the architectural treatment of the eight walls of the Baptistery. The latter is formed of concentric arcades in the upper zone, whose pleasing rhythmic division gives excellent proofs of the skill of the unknown master. The side arches rest on the angle columns a broad abacus and a console corbelled out above each, and each one spans a wider and higher middle arch containing the window, as well as two smaller side ones, within which is again a stuccoed niche with the visible form of a saint. The surfaces of the side arch, like the spandrels above the great blind arches of the lower series are decorated by rich mosaics, while a gayly colored veneering has its place elsewhere.

Concerning the exterior, the hypothesis of Essenwein is very suitable, that the upper third of the strikingly high octagon with its double arched blind niches might only represent a later increase in the height (Compare the conjectural line of the older roof in Figs. 89 and 90). Likewise may another conjecture, recently stated by Ricci, be approved, according to which this baptismal chapel was founded about the middle of the 5 th century by bishop Neon in a room of the more ancient baths adjoining the Church (Ecclesia) Ursiana (see Art. 33); the ground plan and the strikingly low situation are in favor of this, and the ancient dedicatory inscription doubtless permits this conjecture.

38. Arian Baptistery.

The same origin, in this case from the Baths Dragodonis (Droedonis) is also assumedby Ricci for another still remaining baptistery beside the Arian Basilica S. Spirito, the present Church S. Maria in Cosmedin. Its ground plan and elevation correspond to those of S. Giovanni in Fonte; two niches were later destroyed; even the mosaics of the dome imitate those of the earlier baptistery.

39. Mausoleum of Galla Placidia.

Of the mausoleums of Ravenna, one belongs to Galla Placidia, who died in 450, and the other to the Gothic king Theodoric. The former is the simpler one of the two, but in its way is not less in in power of impression.

The building (Figs. 94 to 96 [58]) is kept within moderate

dimensions with the ground plan of the Latin cross (i.e., with a longer western arm), and its entrance side formerly adjoined the vestibule of the near by Church S. Crucis, later reduced in size. The four arms of the cross are spanned by tunnel waults; over their intersection or crossing rises a pendentive dome on awkwardly corbelled blind niches. Each of the wall surfaces enclosed by these stilted blind niches contains an oblong rectangular window; similar ones are also found in each of the lunettes of the eastern and transept arms. Before the massive sarcophagus placed in free position in the eastern arm of the cross stands the altar. While the walls are veneered up to the cornice at the base of the vaults, the vaults themselves as well as the dome are covered by splendidly colored glass mosaics (Golden stars on a blue ground and rich ornamental bands). Artistic as well as significant figure representations finally cover all lunettes and the enclosed wall spaces beneath the dome. Few creations of that period compete with this interior in picturesque splendor. The exterior shows all the walls animated by the projecting bands and round arches characteristic of Ravenna. Gable roofs with gables cover the arms of the cross. Finally, the dome is enclosed by a plain square mass.

*Note 53. From Essenwein.*

40. Tomb of Theodoric.

More closely in ground plan does the Mausoleum of Theodoric (Died 52 ) approximate to the antique tradition. It is built as a decagon in two stories (Figs. 98, 99[53]). Like many Roman tombs with a cross-shaped, tunnel-vaulted chamber, the lower story is decorated by rectangular round-arched niches; a bold cornice marks the beginning of the arches, whose form (toothed voussoirs) is evident in Fig. 97.[53] The thickness of the wall of the likewise externally polygonal and internally circular upper story is reduced so much from that of the lower story, that an external gallery is obtained, also slightly corbelled out on consoles, which is now uncovered, but it was formerly covered by transverse tunnel vaults on piers and coupled columns and furnished with a balustrade. Above the roof of this gallery rises the superstructure somewhat higher with walls here externally cylindrical, in order to terminate with a bold and peculiarly ornamented

cornice, upon which rests the edge of a dome, consisting of a single hollowed stone of apparently 518.1 tons in weight. The members like handles, that decorate the base of the dome, have not been explained in purpose (whether ornamental or structural, i.e., as if once serving for hoisting the stone brought from Istria); hypothetical and scarcely probable is the lantern with a light therein added by Essenwein in Fig. 100. Concerning the place of the cornice ornament in the development of decorative forms, opinions differ, on the one hand as debased antique forms (cymatium, etc.), on the other as invented by the Goths as elements foreign to the antique. The two stairways leading to the upper story are modern; it is a question whether others preceded them in the original design. Analogies for an inaccessible upper story are frequently afforded by the tomb structures of that period (See Art. 66).

According to an inscription, a park originally surrounded the monument. The position of the sarcophagus is uncertain.

c. Remainder of Italy.

1. Southern Italy.

41. Baptistery of Nocera.

Besides the isolated groups of the Roman and Ravenna monuments, the remainder of Italy presents only sporadic remains from the Early Christian period and scattered statements in literary and epigraphic traditions. We must here be satisfied with collecting the different forms, which help to complete the general representation of the architectural development of that time.

In the southern part of the peninsula and in the vicinity of Pompeii is the interesting circular structure of the former Baptistery near Nocera dei Pagani (now S. Maria Maggiore, Figs. 101, 102.[53]). The former purpose of the building is shown by the externally octagonal and internally circular basin (piscina) with three steps and in the middle of the building; in the remains of the still existing columns standing on its edge, and which, from the analogy of the Lateran Baptistery, for example, (see Fig. 83), formerly supported an entablature. In plan and structure the entire design is closely allied to the Mausoleum of Constantia near Rome.(Figs. 54 to 56). Here as there is a concentric design, a higher interior

with a dome on a circle of coupled columns, surrounded by an annular aisle with a tunnel vault. Within these common general ideas, there yet appear a series of differences.

The conjecture of Essenwein, that the apse might have only been added later finds support in the older custom of baptistery churches without apses (in Ravenna the four niches in each were not required by the rite but are merely of formal nature, of antique origin, or arranged directly as additions to the antique ground plan of a central domed interior); they interfere in a disturbing way with the general structure; on their account is now lacking the sixteenth pair of columns, and the arch of double span and higher crown is turned between the adjacent columns.

As a difference from S. Costanza, there is here wanting the entablature block above the columns and likewise the drum with its circle of windows. Even though commencing with a vertical surface, the dome is heavy to the eye and crushing on the circle of columns; at mid-height its section abruptly changes, rising in a new circular arc, higher than at first intended, on this line rest the eight windows with strongly splayed sills, which admit indirect light into the interior through the corresponding windows in the external wall enclosing the dome and supporting the conical roof. Whether, as Essenuein conjectured (see Fig. 101), a skylight at the apex of the dome was originally projected, this is very questionable in view of the purpose of the building. Further characteristics are the strengthening of the outer walls by arches, which rise from pilasters on the external wall and correspond in number to the pairs of columns, and lastly the addition of struts to oppose the side thrust of the dome. Whether later additions occur here is just as much in question as the date of origin of the entire building.

42. S. Giorgio at Naples.

Naples possesses from the Early Christian period almost uniquely in S. Restituta near the Cathedral the existing remains of the peculiar form of an apse opened by an arcade, which is now built into the modernized Church S. Giorgio Maggiore, but formerly belonged to the Basilica Serviana, founded at the beginning of the 5 th century (Fig. 103 [bc]). On high Corinthian

columns rest impost blocks as supports of the arches, and which are ornamented by the monogram of Christ. The purpose of such an opening in the apse was of varied nature, no longer to be recognized at the example in Naples. We have to seek in those gratings (transennae), i.e., the perforated marble plates, such as were employed for the crypt (confessio), the tomb beneath the altar, and also in the apses in direct contact between two adjoining monuments, of a tomb structure in form of a triple choir (cella trichora) and of a cemetery basilica, in order to produce the most intimate connection possible between the tomb interior with the extension in the added basilica. In reference to the double basilica of S. Lorenzo-w-t-Walls at Rome (see Art. 27), we described such an arrangement and a still preserved model of it (S. Sinforosa, Fig. 49).

*Note 56. From Rossi.*

43. Basilica at Nola.

A similarly grand design was created at the beginning of the 5 th century in the vicinity of Naples by bishop Paulinus at the Tomb of S. Felix near Nola. Through opened apses the older Tomb-Church of the saint there communicated with the new and fine building of Paulinus, whose form and decoration are still preserved for us in the poems and letters of the latter.[57] Here deserves special mention the trefoil shape of the choir as a triapsal choir, according to the model of the uncovered cemetery cells, as they yet remain near Rome over the Catacombs of S. Calixtus ind in S. Sinforosa (See Figs. 15 and 49). One of the two side apses (conchulae) in Nola served as a place for the deposit and preparation of the communion gifts (prothesis), the other for the preservation of the church manuscripts and for their reading by believers (diakonikon).

*Note 57. I have given a reconstruction of the design in Zeits. für Bild. Kunst, vol. 20.(1885), p. 185 et seq, to reference is here made. Also compare my frequently mentioned book, p. 78, et seq.*

44. Basilicas at Naples.

The particularly grand example of an open apse effectively executed by Paulinus made its influence still more widely felt in Campania. We find it in Naples, besides that at Basilica Severiana, likewise in S. Giovanni maggiore (about 550), as

well as on a church in Prata near Avellino. Meanwhile, that it was no provincial peculiarity is proved by the occurrence of this motive in Africa also (Oratory in Henschirin), as well as in Gau (S. Martin in Tours and S. Stephen of Chrodegang in Metz), and not less formerly in Rome (Ss. Cosma e Damiano), where in an undivided antique structure (Temple Sacrae Urbis), a transverse wall with an opened apse was introduced; likewise S. M. Maggiore in its earlier form (in the time of Pope Paschalis I), where the room for women (matroneum) was found behind the opened apse.[59] An illustration is also given by a bronze lamp found in a tomb at Algiers and now in S. Petersburg (Fig. 104[58]), formerly in the collection Basilewski at Paris, which in abbreviated form represents a three-aisled basilica with the omission of the side aisles; in the opened apse stands the bishop's throne.

*Note 58. From Kraus.*

*Note 59. See detailed statements in my book, previously mentioned.*

45. S. Germano.

Quite indeterminate is the age of the Church S. Maria delle Cinque Torri in S. Germano at the foot of Mt. Cassino (Figs. 105 to 107[58]). It belongs in the class of central plans with four columns but with a horizontal ceiling; from the angles of the central square round arches extend to the enclosing walls, that likewise rise from a square. The central square is surrounded by twelve columns, as well as the four smaller squares cut off by those arches in the angles of the entire building, are carried higher, while the four oblong rooms between them have shed roofs attached to the middle room.[60]

*Note 60. The small windows given in Hübsch's drawings(if not al all hypothetical) are likewise mediaeval as well as the three apses. On the whole, may not the existing building conceal an antique nucleus entirely isolated in the early church architecture?*

2. Northern Italy.

46. Churches at Milan.

No less uncertain, as for the before mentioned architecture of southern Italy, are the age and earlier form of the very famous churches of Milan, S. Lorenzo, S. Nazzaro, and S. Amb-

Ambrogio. The earliest history of the latter is essentially of archaeological interest; an early Romanesque vaulted structure has replaced the earlier design. It is not impossible, that S. Nazzaro Grande still retains the original arrangement of the plan of 382 A.D. in its undivided cross plan, similar to which and as a possible model, we shall find again in Constantinople. S. Lorenzo is entirely replaced by a rebuilding of the 16 th century, where only the side chapels lying on the principal axes belong to the period concerning us, while a massive colonnade standing at the South shows an antique origin. The question of the founding and original form of the main building belongs to those most discussed in modern times in the realm of architecture, and hypotheses and caprices here in particular closely press upon each other. Weighty voices have been raised for and against the secular origin (either the room of a palace or baths). A view of the form treatment of the plan and of the superstructure of the present building, but not in the least of the incomparable spacious effect of the interior, may be given by the graphic illustration (Fig. 108 [58]). The four sides of the inner square of 78.72 ft. on a side in the clear are extended into segmental niches, which show five arched openings in each between columns and bordered by piers, and that extend in annular aisles, while in each corner lies a square of approximately 164 ft. cleas side. This arrangement is repeated in an upper story, and it is finally completed by tower-like higher parts over the angle squares, with an octagonal dome over the centre, in which an equal length of the sides is attained by projections over the piers flanking the apses. This form of the church is the result of a restoration after a downfall in the year 1573, in which the earlier foundations were retained. Since there may indeed be recognized modern and mediaeval portions in the superstructure of the church, but no Early Christian or antique remains without a searching technical investigation, we must first decide to emphasize the possibility, that the plan of the present building belongs to antique secular architecture (perhaps a palace) or to Early Christian architecture; for both assumptions, there are analogies at command in the wealth of monuments preserved to us, as we shall especially find again in

church architecture in the East, both in the 4 th (Antioch) and in later centuries (S. Vitale, Ravenna). Allied to the antique throughout are the arrangement of the plans of three side chapels, octagonal with niches, and their position on the axes of the principal building (as likewise the case with the colonnade remaining at the South) permits us to necessarily assume the existence of the principal structure near those subordinate buildings in chiefly the same or a similar form. To decide between the acceptance of an antique secular building and of an independent ecclesiastical foundation is a sueless caprice, without making a technical examination of the monument. Until such a decision be made, the presumption in the history of civilization is that the structure already existed at the end of the 4 th century.

47. Cathedral at Parenzo.

Besides slight remains in Aquileia and other places in northern Italy, the principal Church of Parenzo on the western coast of Istria and the Cathedral on the island of Torcello near Venice deserve special mention, both being in their present condition entirely the result of later rebuilding, yet still representing the general tendencies of the early period in tolerable completeness.

At the Cathedral of Parenzo, two earlier structures preceded the present design. The earlier, whose foundations were recently excavated North of the existing church, was a simple oblong building about 29.5 by 75.4 ft. with an entrance at the western end and an almost square subordinate room 26.24 ft. diameter adjoining the south wall. The marks of the location of the four columns and the fragment of a shaft near the eastern wall evidently belong to the altar or its canopy. The remains of this architecturally irrelevant building possess their highest importance in the mosaic pavement, perhaps the oldest remaining to us, whose low position (its depth below the floor of the present church amounting to 5.9 ft., that for the building of the 4 th century, to be described later, being about 2.6 ft.), permits its origin to be placed in the 3 rd century. The fine work is executed in effective polychromy and shows a band-like enclosure and triple subdivision, whose decorative individual elements entirely show the early period of Christian art. Only the symbol of the

fish and a monogram are mingled with geometrical figures, vases and plant elements, also common in the antique. Of special interest is the occurrence of frequent inscriptions, that announce the donation of different portions of the mosaic (mostly of 100 ft. each) by members of the community of Parenzo. This procedure is repeated in the later basilica, and we likewise find it in the Church of Olympia, among others. (Inscription of the reader Cyriacus and of the reader and marble worker Andreas), in Grado, Aquileia, Verona and Brescia.[61]

*Note 61. For pavements in general, see my frequently mentioned book.*

*Note 62. From Lohde, L. Der Dom von Parenzo. Berlin. 1859. pp. 179 - 183.*

*Note 63. From Herder, Eitelberger and Hieser. Mittelalterliche Kunstdenkmale des Oesterreichen Kaiserstaates. Stuttgart. 1859 -1860.*

In the beginning of the 4 th century may perhaps be placed the erection of the first great basilica south of the oblong Oratory, and which was indeed destroyed in the persecutions, and whose southern side chapel is now rebuilt. The basilica corresponded exactly in its masses to the existing church; perhaps it likewise possessed already on the same place an atrium and a baptistery; but the apse may be represented as not polygonally enclosed. Some fragments of architecture and remains of the mosaic floor of this basilica have been preserved; also the former arrangement of the choir is still to be recognized. About the middle of the 6 th century, as stated by the mosaic inscription of the apse, bishop Eufrasius replaced this church, injured by time, by the new structure yet standing, which well sets forth in its plan the idea of the Early Christian basilica of that period under the influence of the Eastern, Ravenna-Byzantine style of art (Figs. 100 to 112 [63]). The apse now appears externally with six sides based on the dodecagon; four sides are adorned by round-arched windows. The side apses are externally enclosed in rectangular form, so that they appear as if recessed into the thickness of the wall. Eighteen columns with Byzantine-like capitals and impost blocks support the arches. Three windows open in the western end wall, to which is attached the shed

roof of the eastern portico of the atrium. These porticos are all preserved and exhibit two columns in each between the angle piers with a wider middle intercolumniation and a proportionally higher crown.

*Note 84. From Hübsch. The connecting portico is an erroneous assumption.*

Adjoining the western portico is the octagonal Baptistery, ( now a museum), internally decorated by niches in the walls. It is not impossible, that a ruin located at the north contains the former consignatorium, into which the baptized persons were taken to receive names, as for example, we likewise find in Syria.

Besides the remains of a colored external covering on both gables, the church still retains the entire mosaic decoration of the choir. to the mosaic of the apse (Madonna with saints) and the separate figures between the windows of the apse are added the rich veneering of the lower walls, and the rich mosaics of the triumphal arch (Christ and the apostles) have been recently uncovered again. The pavement adorned by rich mosaics has unfortunately been replaced by a new one.

A subordinate work at Parenzo, although less rich in details, is presented by the Cathedral and by the Baptistery at Grado, interesting among other things by the throne as well as by the marble window screens from the 6 th century (See illustrations, Art. 72). S. Maria in Grado also deserves consideration.

43. Cathedral on Torcello.

The new and thorough investigations of Cattaneo have entirely reversed the dates of the Cathedral on Torcello.(Figs. 113,114.[84]) Everything essential to it first belongs to the rebuilding in 864; from the earlier structure of the 5 th century, there has indeed been taken little more than the general arrangement and the principal apse, yet with the exception of its external covering. Only late originated the vaulted porch over the middle portal, when the narrow passage was covered by a tunnel vault, which was made between the facade and the Baptistery near by. The original and later greatly reduced form of the latter is still shown by the remains of the niches of two sides of the octagon. The interior of the church presents in the row of columns before the choir, as well as in the concentric seats

for the priests and the bishop's throne a representation of the ancient custom. The considerable rise of these seats was here compulsory by the arrangement of a crypt (confessio), the annular passage of which could not be carried too deep below grade.

d. Beyond the Alps.

49. General Development.

To the northern nations was reserved the great problem of carrying church architecture to a new stage of development. From the epoch at which these new ideas began to ripen, we are accustomed to date the history of the mediaeval styles, the Romanesque and the Gothic. The transition was slowly completed and irregularly on the new field of civilization beyond the Alps; more slowly and frequently with opposition did the southern nations follow. The roots of this movement extend far back and branch in manifold ways. Not by years and not even by centuries may the beginning of the new style be exactly fixed; the limit between Early Christian and mediaeval architecture has a very wavy course; it frequently passes as if through the midst of a monument, which with equal right may be referred to one or the other period. It has no less charm to the historian to observe and to make clear the sporadic germination of new inventions in the description of antique art slowly passing into Early Christian, since there is need and even necessity for the historian of the mediaeval styles to follow the new stream back to the apparently most hidden sources.

*Note 55. From De Caumont, A. in Bulletin Monumental.*

Where the description of both periods flows from the same pen, it is of relatively slight importance at which point the one chapter ends and the other begins. Otherwise, when the work is placed in different hands, which work together but must avoid repitition. The first condition was kept in mind for this Handbook in the first preparation of the material in question, the late author had assumed the work of the succeeding period of mediaeval architecture. Both domains are now separated, and since it appears to us in agreement with the author of the next volume , to be in the interest of a clear solution of the problem, to rather assign a series of monuments to the introduction of Romanesque architecture, than as

formerly to place them as the final results of the preceding period.

Thus we here limit ourselves to clearly treating the few tendencies, which the primitive architecture of the North may exhibit in the ecclesiastical domain in direct dependence upon the general representation of Early Christian architecture.

50. Cathedral at Treves.

First of all should a building be mentioned, which is only to be reconstituted by the hypothetical combination of slight fragments, but which has frequently busied archaeologists as architects; the original form of the Cathedral at Treves.

Four massive Corinthian columns with unfluted shafts, of which the remains were found buried in the rubbish under the mediaeval rebuilding, were apparently placed at the corners of a square, that was enclosed by the walls of a larger square. The remains of something like a hypocaust (heating furnace) in the central square appears to indicate a not original elevation of its floor. All else is hypothetical; the opening of the building for the entire western side, the arches of the interior, the abundant windows (which is entirely nonsensical with the assumption of that open western side), the acceptance of a sepulchral tegurium in the centre of the building, and many other things. Only the conjecture is justified, that this concerns the remains of a secular structure; all further suppositions concerning the superstructure, importance, and date of origin of the building (in reference to which the extreme limit is given by a coin of Gratian found here), are nothing more than the products of the imagination, which have no place in a purely historical description.

The same is true of S. Gereon at Cologne, whose mediaeval decagon rises upon antique foundations.

51. Churches in Gaul.

the actual ecclesiastical foundationsof the first centuries before Charlemagne on northern soil are necessarily only to be recognized in written tradition; what Gregory of Tours tells us in his History of the Franks (6 th century), or is earlier stated by Apollonius Sidonius, is joined without notable differences to the idea of the basilican architecture of that period; the splendor of the ornamentation in the

coffered ceilings, gleaming with color, the shining mosaics and pavements chiefly charm the authors into astonishment. Unless certain finds are deceptive, then the plan with transepts, which Rome at first can show in quite isolated cases, found particular imitation in Gaul. To describe its development into the transverse aisle with the crossing belongs to the most interesting chapters of early mediaeval architecture.

It is hard to decide how far toward the latter may be reckoned the remains on Gallic soil in Figs. 118 to 121, as well as those given in the adjoining Plate (in Poitiers, Suevres, and other places), as well as the so-called Roman Tower at Cologne; we merely wish to mention them here on account of certain external appearances, which are justly to be designated as representative of the Merovingian period. The characteristic effect consists not merely in the brutal and rude changes of the antique forms, which penetrated into the country before the Roman period; the marks of the declining feeling for form alone is represented in an essentially different manner by works, such as the Palace of Diocletian near Salona and numerous buildings farther east. Here in Gaul, it concerns something different; here enters a new factor, which compels the peculiar caprice of these appearances; the joy in the painted ornamentation of surfaces, but which does not employ colors or mosaic, but merely the frequently rudely wrought building materials in usually fabric patterns. Lozenge and chess-board patterns, circles, semicircles alternating with gables and gabled facades with four columns and other forms; everywhere is the steepness of the gable to be considered, which shows that the eye is accustomed to the native wooden architecture with its high roof of reeds or of shingles; even the doorway and window arches built of voussoirs must be taken as ornament; horizontal bands of flat stones, herring-bone patterns and the like enrich the series of motives, whose details are scattered over the surfaces in frank combination. Alternation in color, position and form of the stones frequently suffices; in other cases are added feeble attempts at members in relief, by low cornices, consoles, pilasters, etc.; piers projecting to strengthen the an-

angles do not preferably extend to the crowning cornice, but are covered by a little gable instead, a form likewise found on the remains of the so-called Palace of Theodoric at Ravenna, in which we have to really see a building erected under the influence of northern ways about the 8 th century.

*Note 66. From Verneilh. Architecture Byzantine en France. Annales Archaeologiques. Vol. 11 (1851).*

52. Portico at Lorsch.

To the Merovingian structures mentioned is also added on account of its ornamentation the Frankish Gateway Portico at Lorsch in the Rhine valley (Figs. 122 to 125), really the propyleum of the atrium of the church. In view of the purpose of the building, the dimensions are not inconsiderable, being fully 36.1 ft. wide and 24.6 ft. deep. The piers of the three equal arched openings are decorated by rather slender half columns with Composite capitals, which support a weak cornice ornamented by leaves. The upper portion of the facade is adorned by ten equally spaced fluted pilasters, from whose Ionic-like capitals rise steeply inclined bands. Three round-arched windows appear above the lower arcade. A simple cornice with consoles forms the upper termination. With this so remarkable relief decoration is combined the surface patterns of entirely fabric character, executed in white and red slabs.

A comparative glance at the buildings previously mentioned leads to the recognition of an abrupt change in artistic endeavor in the example at Lorsch. If, as tradition has it, Eginhard, the artistic counsellor of Charlemagne, was concerned in the building, it may owe its origin to another, for it attests the changed marks and the wandering into artistic invention, like the other creations of the Carlovingian period; it is the endeavor to free itself from the caprice of imagination, and to win again the purity of the antique. The ability does not indeed here equal the desire; compared with the pure Ionic, the pilaster capitals appear as caricatures; for an imagined picturesque charm, the flutes are interrupted at the middle, etc.; but with the Merovingian art, the Carlovingian appears indeed as a kind of Renaissance. As before remarked, its more detailed description belongs to the succeeding volume of this Handbook.

## Chapter 8. The East before Justinian and North Africa.

### a. Palestine and the Balkan Peninsula.

#### 58. General Conditions.

What the oldest christian basilicas of Rome known to us are for the church architecture of the West, that is meant by the contemporary descriptions of the chubches of Palestine for the East of the Roman empire; they afford the proof of the scheme of the basilica for interiors used for church assemblies, already prevailing generally in the days of Constantine. That exceptions also confirm the rule has already been shown in the West in different examples and will also be proved in the East. Likewise numerically predominant everywhere in the East until Justinian was the longitudinal structure.

The fate of the East was sparied to the West, the flooding of the vast domains by the hordes of Islam, and which once obeyed the emperors, prepared a different fate for the evidences of Christian religion and art. Those far removed to the edge of the eastern desert on the frontier posts of western civilization saw during the sudden invasion of Mohammedanism, the Christian people vanish therein as at one stroke; nomads then wandered through the abandoned seats of a rich civilization without any tendency to fixed settlement, then leaving the buildings to the fate of desertion. This is the peculiar condition, that has so wonderfully preserved to us the idea of the Syrian Christian communities in their monumental remains. Elsewhere in places farther West, Islam became stationary, and it took part at least indirectly in the destruction of the monuments of the Christian religion by the use of their materials for its own secular or religious purposes. Whatever remains yet standing in Palestine, Egypt, Asia Minor, or on the soil of European Turkey, of the ecclesiastical foundations of the earlier period is chiefly modified mor or less for other purposes, but is numerically quite scarce in proportion to the former abundance. Only in written traditions do these shine for us in their splendor, and recently excavated ruins justify and explain the picture there given. Especially from the first splendid period of church activity, from the days of Constantine, the contemporary biographer of the emperor, the church historian Eusebius gives us the first sketches for this

picture. They knew much that is now lost, even if not always affording a sufficient substitute in details.

54. Church of the Holy Sepulchre at Jerusalem.

Constantine's ecclesiastical foundations in the new capital on the Bosphorus are no more than mentioned by name, but the buildings on the soil of Palestine are rather thoroughly described. One of the largest designs adorned the place of the Holy Sepulchre near Jerusalem; repeated destruction and changes of plan in the middle ages have strongly obscured the original idea, which is not quite clearly sketched by Eusebius. A memorial of apparently central form rose over the sacred place itself in the midst of a court enclosed by porticos, with a five-aisled basilica with galleries adjoining its eastern side. While columns supported the walls of the middle aisle, piers were exceptionally employed in the side aisles, an arrangement that we shall again find on the Basilica of Ibrahim in Upper Egypt, among others. Richly gilded coffered ceilings extended over the entire interior; the roof was covered with lead. An atrium surrounded by porticos extended before the western facade, adorned by a rich portal structure. As a special ornament of the choir are also mentioned twelve columns, on which stood silver vases; they were perhaps erected with connecting entablatures, similarly to the iconostasis columns in S. Peter and S. Paul.[69]

*Note 67. From Hübsch.*

*Note 68. From Salzenberg.*

*Note 69. A more thorough examination of the numerous attempts at reconstruction of the entire design is opposed to the purpose of this discussion. I will return to it in another place.*

55. Basilica at Tyre.

Almost contemporary with the Church of the Holy Sepulchre, there arose in Tyre the Basilica likewise mentioned by Eusebius, whose form we are still able to recognize in the sermon of consecration by bishop Paulinus. Into the precinct enclosed by walls led the great propyleum on the east; between it and the front of the basilica was a separate atrium surrounded by porticos, with the fountain (cantharus) in the midst and artistic wooden balustrades of net patterns in the inter-

intercolumniations. Thees doors, the middle one being wider and its leaves with reliefs, led into the interior of the basilica with its ceiling of cedar wood from Lebanon and its shining floor of polished marble. Likewise are especially mentioned the seats for the priests and the altar with its rich wooden railing. Halls and exedras were added in close connection with the main building, "for those that need remission of sins and purification by water and the Holy Spirit," i.e., a baptistery and other subordinate structures were arranged within the precinct.

56. Basilica at Bethlehem.

If these two examples of the period of Constantine have disappeared, yet another building, the Church of the Nativity at Bethlehem (Fig. 128[67]) retains still considerable remains of that foundation epoch, particularly the five-aisled nave, in which the rows of Corinthian columns bear the clearstory walls on a horizontal entablature. Justinian later restored the building; his work is the centralized ground plan of the choir with its trefoil grouping of three vast apses, as well as the insertion of a closed narthex between the facade and atrium.[70]

*Note 70. See my frequently mentioned book, p. 23 et seq.*

57. Church S. Maria at Jerusalem.

How much weight the age of Justinian laid on the plan of a complete atrium instead of the soon predominating simple porticos is shown in the Church S. Sophia and other well known monuments (see below), for example in the Church S. Maria in Jerusalem, which Procopius has described for us. It almost appears as a recollection of Eusebius' description of the Church of the Holy Sepulchre or of the Basilica at Tyre, when the author in the time of Justinian praises the astonishing view of the propyleum and promises wonder upon wonder to those entering. Four rows of columns surround it in the court; only before the middle of the church facade is the horizontal entablature interrupted by a high arch. This motive was already common to late Roman art, is repeated by buildings in the East as well as by Diocletian's Palace at Salona and many others, recurs in a similar place in the atriums of churches, and among others, again on the Church S. Sergius in Gaza, built under Justinian, which we likewise know only by written tradit-

traditions in Choricius of Gaza.

58. Constantinople.

The favorite motive in the East from the beginning, of galleries over the side aisles, is also found in the oldest basilicas remaining in Constantinople and Thessalonica, although modified. The Church S. John in Constantinople exhibits it, and which was built by Studios (Fig. 127 [68]). A quite simple entablature, only consisting of a plain architrave and cornice, extends above each sever lower Corinthian columns; from this formerly rose slightly smaller ones with very simple forms of capitals, to connect them being rightly assumed semicircular arches with reference to the very wide free span of the lower entablature. A skylight story, instead of the roof now uniformly covering the middle and side aisles, is to be taken as self-evident, from the analogy of all monuments. Vestiges of an atrium are indicated, whose intercolumniations were apparently closed by high grilles, shown by the side view of the capital of a column and the architrave of the doorway in the facade portico. This strict separation of the portico, marked by the height of the grille, which is also mentioned in Tyre, finds the explanation of its purpose in the remark made thereon, that in these porticos of the atrium, the instruction of the converts was frequently performed. The fore-court of the Basilica of S. John was much changed at a later time.

59. Thessalonica.

To approximately the same time is justly to be referred the date of the founding of a three-aisled basilica of unknown name (now Mosque Eski Djuma) and the Church S. Demetrius in Thessalonica, both characterized by galleries , and the latter also by its five-aisled plan. The Eski Djuma (Figs. 128 to 130 [71]) shows semicircular arches over the 24 columns each of the side aisles and of the galleries, which do not rest directly on the very rich Composite and Ionic capitals, but on similar artistically ornamented impost blocks. As in the Church S. John in Constantinople, there is doubtless to be supplied the lacking skylight story in the centre aisle. Any further discussion of the treatment of the details, and especially of the probable chronology, has no value without a dissection of this building, or for the following Church of S.

Demetrius. The illustrations presented for the latter (Figs. 181 to 183) certainly represent the succession of different architectural periods. The external side aisles with their arcades extending into the inner galleries, the changes in the transepts and other things are plain evidences of different phases of development; Essenwein's proposal of the insertion of two piers in each row of supports of the centre aisle can scarcely be accepted.

*Note 71. From Texier & Pullan. Byzantine Architecture. London. 1865.*

80. Churches in Antique Buildings.

The domain of existing Turkey in great part still awaits more careful research for Early Christian remains, yet hereto fore the hope for finds has been restricted to a very limited amount, because where in the early period soon arose the cities adorned by the sees of bishops, Athens, Corinth, Patras and other places, there either occurred a later destruction by the Turks or a rebuilding in the Byzantine central and domical architecture. We shall later glance at the latter in other relations; we have here to busy ourselves briefly with another theme, an episode, for which Greece furnishes striking illustrations; the adoption and adaptation of antique buildings to church purposes. Two examples are here selected; the Parthenon in Athens and the Theokoleon (Ergasterion of Phidias,, according to others) in Olympia. Both had to suffer internal changes to fit them for their uses. At the building in Olympia, the prechristian plan was removed as far as the external walls; then the eastern entrance, over 18 ft. wide, was enclosed by the semicircle of an apse, and the interior was divided anew in the manner shown in Figs. 184, 185. What was thus obtained was an interior entirely corresponding to the general scheme of the basilica, but the designation of "Byzantine Church" has been quite erroneously applied to this monument. The transformation was probably effected in the 5 th century; after the middle of the 6 th already followed a restoration of the building, injured by the earthquake of 551, in which the pavement was placed almost 1.64 ft. higher.[72] Inscriptions in the pavement also here tell of the endowment by certain members of the community of Olympia, just as in Parenzo and elsewhere. The modest size of the community is expressed

by the dimensions of the building. The external walls of the antique design gave space for the three-aisled interior of the church, the vestibule, a fore-court, and two subordinate rooms. Only the apse and a small propyleum on the southern side project beyond the antique walls. The usual furniture of the interior is all present in the ruins; seats of the priests, altar, ambo and railing, the latter wrought with perforations in the antique style, with slabs (transennae) ornamented by the pattern of semicircular arches above each other, but which show themselves as Christian work by the cross in the centre.

*Note 72. See further in the Author's Kunsthistorische Studien. Tubingen. 1886. Sect. 3. Christian Antiquities in Greece.*

The reversal of the orientation was likewise the first step in the consecration of the Parthenon as a church. Here also was added to the eastern entrance doorway the apse projecting into the portico; in the interior of the cell was perhaps only later undertaken a widening of the side aisles by moving the columns nearer the middle. On the other hand, the design for a new western entrance was necessary, for which the wall was broken through, which formerly separated the cell and the treasury at the west, the Parthenon in a more limited sense, so that the latter became the vestibule of the church.

Similar methods were commonly repeated in the alteration of antique temples by the Church; for smaller dimensions, which did not permit a basilican division of the cell, recourse was had to cutting the cell walls into pier arcades and walling up the intercolumniations of the portico to obtain side aisles. Examples of this kind are presented by the Temple Concordia in Agrigentum (Akragas),(the now abandoned Church S. Giorgio delle Rape), Temple Athene on the island Ortygia in Syracuse (S. Maria del Piliero), and S. Maria dei Greci, a former hexastyle Doric temple, likewise in Agrigentum, and others.

b. North Africa.

61. Northern Africa.

To the picture, which the previously considered parts of the domain of the Early Christian Church unfold before us, quite numerous additions are afforded by the Roman provinces of Northern Africa, especially since the latest researches in Numidia, Mauretania, and the adjacent provinces. More than the now

longer known remains of the Early Christian period on Egyptian soil, do these monuments in part have the advantage of dates assured by inscriptions, etc. The condition of the remaining portions is nowhere very remarkable; aside from certain extensive remains, as in Tebessa, the hundreds of ruins chiefly rise but a few yards; many are even entirely or partially destroyed. The material and workmanship with few exceptions show neither the care nor goodness, which have surprised us in the antique buildings of Northern Africa.[76] The most common kind of masonry is stone-beam work, i.e., split stone masonry between cut stone stretchers, the distances between which vary from 2.62 to 6.56 ft. Brickwork is very seldom found. The theckness of the walls averages about 1.64 ft. Ceilings and roofs have vanished; the frequently abundant finds of charcoal permit the conjecture of wooden roof trusses. Different members of the structure, especially the columns, were often entirely or in part taken from antique buildings; where they were wrought again, Christian symbols were preferably employed in the ornamentation; the treatment of the details is dry and heavy. The churches always have the apse turned toward the east, even at the **cost** of convenient access was this orientation carried out, as shown by the Basilica at Tipasa and others, whose facade was set quite close to the city wall.(Fig. 137).

*Note 76. On this point, see the Author's "Timgad und der Römische Provinzialarchitektur in Nordafrika" in Die Baukunst, Series III, Heft 1. 1906.*

Many ruins permit the recognition of structural changes, that here consist of extensions, there of reductions. The three-aisled plan prevails; five aisles occasionally occur, but without important dimensions, a greater number of parallel divisions (Damus-el-Karita at Carthage, Basilica of Salfa at Tipasa (Fig. 137) and others, as they now exhibit separate remains, is indeed only the result of later rebuilding and additions of various periods; certain rows of the foundations of columns again uncovered, we have to consider as having been concealed beneath a new and raised pavement at the time, when the new rows were erected. The supports themselves here generally consist of square pillars; likewise the arrangement of columns along the middle aisle and piers between the side aisles,

occurs, as in the sepulchral church. (For example in Tebessa, as well as in Ibrahim in Upper Egypt). The horizontal entablature above the columns is here unknown to church architecture; the semicircular arch of voussoirs prevails everywhere; imposts sometimes occur. Peculiar is the occasional arrangement of coupled columns, or of columns and piers. (For example in Tebessa and Morsott). There the clearstory walls rest on the rear supports next the side aisles, while the front columns next the middle aisle support smaller upper columns. (Fig. 138).

*Note 77. From Hübsch.*

*Note 78. From Kraus.*

Galleries over the side aisles are very rare, originally, i.e., at the time of the erection of the entire building; they only occur in the great Basilica in Tigzirt of the 5 th century, a according to Gsell's illustrations, they appear as a later addition in Tipasa (Figs. 138, 139 [79]), at the Basilica of S. Salfa in Tipasa and in Matifou; we have no further information concerning Orleansville, since the ruins have been again destroyed.

*Note 79. From Gsell, S. Recherches Archaeologiques en Algerie. Paris. 1893.*

The choir invariably has the apsidal form; where the room appears externally of rectangular shape, it is frequently doubtful whether an apse was not originally built. The sacristies (prothesis and diakonikon) generally project beside it, all three rooms are sometimes externally enclosed by a straight wall in common, just as the preference for such a straight ending likewise occurs in Egypt.

The exceptional form of the trefoil apse, recalling the cella trichorae, is likewise found in Africa, for example in Kherbet-bou-Addousen (Fig. 140 [80]). Remains of choir railings frequently remain, as well as of the valuable mosaic pavements. Anomalies in the position of the altar (for example in Tipasa) are perhaps the result of later alterations or additions, be - sides which the earlier table altar still remained in the apse. Atriums only appear twice with complete certainty, in Tebessa and in Henchir-Tikoubai; men were usually satisfied with the vestibule, which sometimes assumed the form of an enclosed narthex.

*Note 80. From Gsell,S. Recherches Archaeologiques en Algerie. Paris. 1893.*

The custom of burial within the church was foreign to the earliest Christian period, but it appears in Africa after the 5 th century; the graves are there numerous beneath all the aisles of the church, and likewise numerous are the cells (cubicula) around the principal building, as Paulinus of Nola already mentions at his Basilica S. Felix (Art. 43), and as generally shown by the cemetery basilicas of the West. (For example, S. Silvestro near Rome, or the Basilica in Manastirine near Spalato).

The Basilicas of Benian and of Castiglione posses crypts with side rooms. In Benian, the apsidal confessio beneath the apse had a small window in the rear wall and an entrance at the side. The erection of this cemetery basilica falls before 439, and it was dedicated in memory of Robba (died 434).

But one peculiarity of African monuments remains, which indeed independently occurred in the West only late and after the beginning of the middle ages, a tomb in the form of an exedra at the western end of the basilica and opposite the principal apse, built like a kind of second choir, or according to African custom, constructed like the eastern apse and not projecting externally. One of these examples at Orleansville in Algeria (castellum Tingitanum; Fig. 136) is particularly valuable on account of its dated inscription; to the five-aisled basilica erected in 325 was added in 475 the second apse with the tomb of bishop Reparatus; from the custom of apsidal memorial cells (cellae memoriae) there have been transferred here the two columns before the exedra. Another example is afforded by Egypt in the Basilica at Erment.(Hermenthis).[81]

*Note 81. Compare the Author's "Ueber den Ursprung und die Bedeutung der Doppelchore." Beitrag zur Kunstgeschichte. Heft. V. Leipzig. 1882.*

c. Central Syria.

62. Peculiarities of Syrian Buildings.

Allied to African buildings by the preference for cut stone, the monuments of Central Syria now differ from those by the entirely better preservation, which makes them invaluable to us and frequently the sole evidence in many questions in the history of Early Christian architecture. The circumstances to which we owe this relatively excellent condition of the buildings have already been incidentally mentioned in Art. 58. The large Christian population, that dwelt in more than a hundred villages in the Hauran mountains eastward of Damascus and further northward toward Aleppo, still preserved in the greatest series of ruins, was evidently driven away by a violent invasion of nomadic Mohammedans in the beginning of the 7 th century and never returned; what it created in the sacred and secular domain with its abundant means and great artistic sense was surrendered to the conquerors; but their lust for destruction did not destroy it. Only the common ruin resulting from desolation and the effect of earthquakes fell upon the massive structures, in part erected (in the Hauran) without any use of wood; their graphical restoration is facilitated by the frequently ruined indeed, but not lost materials, as nowhere else occurs. The illustrations are almost entirely due to the extensive publication od De Vogue, upon which all discussions have since been based, as well as the following one. We must again limit ourselves here to the characteristics of importance for the historical development.

82. *From De Vogue. La Syrie Centrale etc. Paris. 1865 -77.*

63. Form of Plan.

With the exception of a few central designs to be describped later, the Syrian churches adhered in the arrangement of the plan entirely to the normal type of three aisled basilica. Only once is found a five aisled structure (in Souideh, Fig. 142[78]), quite rarely an undivided interior (for example, in Babouda, Fig. 143). The vestibule is seldom wanting; but the atrium only appears at one originally antique building, later consecrated as a church (Kennawat, Fig. 144). In Konieh are preserved precincts near two churches (see plan of one in Fig. 145), to which on the south of the basilica

 82

leads a propyleum with an internally projecting gate lodge and guard room, with two mausoleums standing within the enclosure.

The subdivision of the interior is rarely made by piers but generally by columns. In the side walls are arranged numerous windows and also frequently two entrances, which are sometimes adorned by projecting porches. With one rectangular exception, the choir always shows the apse of approximately the same width as the centre aisle, frequently raised two or more steps and decorated by windows. The apse is often of polygonal form externally; included beside it or even within the principal mass of the basilica lie the prothesis and diakonikon, behind the side aisles and slightly oblong in plan; of the entrances to these (with nine exceptions, where they are made of the same widths), that of one room is opened for its entire width, while that of the other is often made a narrower doorway (Figs. 148 to 154), doubtless an indication of the former purpose of the room, while the large and convenient entrance to the prothesis points out the one in which the community deposited the communion gifts, while the more nearly closed room contained the diakonikon or sacristy.[88]. A small side doorway sometimes connected the latter with the principal apse. Concerning the superstructure of these rooms, it should likewise be here mentioned, that upper stories are frequently found above them, which perhaps served for the preservation of the sacred utensils, etc.

88. *Compare other structures in my frequently mentioned*

64. Superstructure. See *book, pp. 90 to 94.*

All Syrian churches reject galleries without exception. The apparently sole variation from this rule in Tafka is indeed to be placed in the series of antique monuments adopted by the Church, among which it has its analogue in the vicinity (Schokka). Likewise is the increased height of the middle aisle invariably carried out in all ecclesiastical basilicas, though absent in these two monuments.

The system of construction of the last mentioned work is apparent from Figs. 155 and 156, and it is extremely indicative of the practical and inventive sense of the master in the woodless Hauran mountains. The connection of the

supports, the floors of the galleries, the ceiling and roof of the building, all was certainly to be made of cut stone. A secure bearing was therefore to be provided for the stone slabs employed, and for this was necessary a series of supports. Six square piers border each side of the centre aisle; to these correspond somewhat deeper piers at the external walls. Square across the centre aisle are turned semicircular arches from pier to pier; arches likewise extend lengthwise between the piers, but in a duplex arrangement above each other, and the same system is repeated six times transversely within the side aisles. In this way is provided a strong skeleton of supporting members, which, by the corbelling of the top courses, especially of those beneath the floors of the galleries and the stone slabs of the ceiling and roof, provide a secure support and reduce the unsupported span as much as possible. The imposts of the arches and the corbels are simply and strongly profiled.

The arrangement of transverse arches in the centre aisle is repeated in Syria once in the northern group at Rouieha. (Fig. 157). The reason for this motive here was not of a structural nature, as in Schakka and Tafka; it was unnecessary to obtain a bearing for stone slabs here, where a wooden framework was erected; rather were the arches built at wide intervals on square and high fluted projections from the broad and low piers, that bear the semicircular arches supporting the clearstory walls of the side aisle. A design similar in the last respect is once found in Qualb-Louzeh (Fig. 158), with arcades of very wide span, which for technical reasons and on account of the ceiling, shape the interior for its purposes as simply as possible, omitting the transverse arches.

The connection by arches also prevails in the greater number of columnar basilicas. Only one example of the horizontal entablature in common use in secular basilicas is known, in Betura.(Fig. 162). The axial spacing only amounts to 5.58 ft.; yet in order to reduce the free span of the architrave, the rudely profiled capital projects sidewise like corbels, so that the length of the free supporting architrave is only 2. ft. But even in arcades, the intercolumniations

are frequently strikingly narrow. Thus it might occur, that in Moudjeleia two horizontal ashlars were employed instead of voussoirs, out of which the arch is cut, with a cornice also wrought thereon (Fig. 160 ).

The arrangement of the windows is particularly rich in Syrian churches. The rule places in the clearstory one above each intercolumniation, two are even so arranged in Kelat-Seman (Fig. 166 ), and a window also corresponds to each column in Baquoza (Fig. 169 ). The form is oblong with a semicircular arch, and similarly in the side aisles. Where a straight lintel is selected, this is generally relieved by a lunette, as at the doorways. The entrance end also shows windows in the upper part of the walls; besides the oblong windows, there also appear round windows, sometimes with a massive stone cross, for example in Tourmanin (Fig. 159 ); compare Qualb-louzeh (Fig. 163 ) and Babouda (Fig. 164 ). Tourmanin also possesses wide windows with mullion columns or mullions with half columns. Likewise here as in the arcades, the semicircular covering is not effected by voussoirs, in case of small dimensions, but it is simply cut out of a single block (for example in Kokanaya, Fig. 169 ).

Extremely decorative and animated on the clearstory walls of the middle aisle is the effect of the little columns projecting on corbels and employed as supports of the ceiling beams, for example in Qualb-Louzeh (Fig. 158 ), Tourmanin, (Fig. 159 ), and Kelat-Seman (Fig. 166 ).

65. Exterior.

The Syrian churches finally win a predominating charm by the exteriors, rich in their rising masses and developed with entirely original ideas, recognizable though not wholly free from later changes. All sides are here equally considered; yet the chief part is naturally taken by the facade.

With the exception of rare square endings of the eastern end, every part of the building is externally shown in accordance with its plan and structure quite clearly and without any disguise. There plainly rises the gabled roof of the centre aisle with its gables, always dominant; the shed roofs of the side aisles and the dome vault of the apse are clearly perceptible. Entirely novel is the treatment of the vestibule,

for example in Tourmanin and Qualb-Louzeh. In both cases, these open above a flight of steps by a massive round arch, which is always flanked by tower-like structures at the sides. A bold cornice at the roof line of the side aisles unites the lower part of the facade. Beside the entrance at Qualb-Louzeh, two stories may be recognized by their windows. Above this, as in Tourmanin, rises the upper story with gabled roofs, arranged at the same height as the gable of the centre aisle. The basilica at Tourmanin shows between these towers a loggia with columns, and that at Qualb-Louzeh has an open balcony. The ornamental motive of the upper loggia is likewise employed for the single-aisled Church at Babouda.above the triple lower columnar portico. By the single common gable is thus here emphasized, even in the facade, the undivided design of the whole.

Among the apses chiefly prevails the external treatment like that at Qualb-Louzeh and that of the principal building at Kelat-seman. As likewise in Tourmanin and Baouoza, for example, in both is first a strongly marked basement; from this rise above each other two rows of columns in such wise, that the windows of the apse and half columns alternate. In Kelat-Seman, the basement is returned beneath these so as to produce pedestals, and likewise with the belt cornice above them and extending around the middle of the apse, upon this again stand the upper half columns, upon which are placed the here strongly projecting impost-like cornice blocks. In their function as supporters of the crowning cornice, they are supported by the alternating corbels; between both niche-like recesses with shell-ornaments serve to ornament the cornice. (Fig. 168). The pedestals are wanting in Qualb-Louzeh, as well as the belt-cornice, the plain plinths of the upper columns here rest directly upon the capitals of the lower ones. (Fig. 167).

Like an abbreviation appears the decoration of the apse in Tournmanin, where exist pedestals indeed and corresponding returns in the cornice, but no half columns, while in Baouoza, according to the evidence of the corbels alone remaining, only the upper half of the wall of the apse seems to have been

adorned by half columns.

The belts already mentioned on the apses likewise form an essential means of decoration on the sides and the facades. The taste of the Syrian masters was far more devoted to relief members, than in the West with its preference for painted ornamentation, and this is also expressed in the interiors of the buildings, accordingly here are extremely rich and even fanciful forms, which esthetically leave nothing more to be satisfied. For example, a cornice frequently encircles a series of windows like a band, sometimes turned at right angles at the base, also sometimes extending further in a curve until it coils up like a volute.(Fig. 167 ). An idea of the abundance of members is given by the facade of the octagon of Kelat-Seman, among others.(Doors and windows were later walled up in part). Classic profiles in complete purity are seldom found; the superabundance of ogees, rolls, quirks, bands, bevels, etc., is the usual characteristic of archivolts, architraves of doors and windows, bases, cornices, etc. (Figs. 168 to 178 ).

The difficulty in working extremely hard stone, for example, in the Hauran, must further be taken into account for many of these works. But the joy in rich reliefs is not lessened to the sculptor thereby; yet the hardness, angularity, and notching of the forms finds its explanation in this. In the ornamental forms on the capitals, lintels of doors, cornices, etc., plant elements exclusively prevail; particularly may the traditional notched acanthus be recognized in variously conventionalized forms.(Figs. 179, 180) . Characteristic forms found elsewhere in the East, (Jerusalem and other places in the East), like the leaves bent sidewise as if moved by the wind and similar shapes, are intermingled. The antique forms of capitals appear strongly reduced in part (Figs. 181 to 186 ); entirely new ones occur, in which for the advantage of a bearing for the architrave, the diameter is greater sidewise, so as to produce an oblong plan of the abacus (Figs. 187, 188 ). Christian symbolism likewise plays a great part, the cross and the monogram of Christ, the latter also in a form combined from the Greek and Latin, in which P is replaced by R is especially common. To these are added numerous inscriptions, particularly over the portals, that by the dates given are often of great

value for dating the monuments.

*Note 84. See my Essay on Nola in Zeitschrift für Bildende Kunste. 1885. p. 138 et seq.*

*Note 85. See further my frequently mentioned book, p.58 e.s.*

The ornamentation for smaller dimensions, for example on tombs, is illustrated by the leaf of a door wrought in stone. (Fig. 189).

66. Kelat Seman.

As Syria is especially rich, not merely in well preserved churches, by in the most varied accessory buildings of every kind, so it also possesses a unique monument in a memorial church, such as may be found nowhere else in this form. It is the plan of Kelat Seman, which takes its name from S. Simeon Stylites, who ended his life as an ascetic on a column here. Already during his lifetime, multitudes of adherents had settled here, and after his death (459), besides the buildings already existing, they began to enclose with a monumental structure the places where the saint had preached and the column 39.12 ft. high as a sacred place, consecrated as a memorial. The octagonal space, about 98.4 ft. wide, was surrounded by wide pier arcades, so that the column composed of three drums and whose pedestal is still in place, stood in the middle of the area under the open sky.(See the adjacent Plate and Fig. 191). This hypethral design is entirely characteristic of memorial churches. On the four sides of this octagonal court toward the principal points of the compass (with a small deviation) adjoin three-aisled basilican halls, three of them being exactly similar with twelve columns in each supporting the clearstory walls of the centre aisles and with entrances or porticos at the ends opposite the octagon. The eastern basilica is alone made about a third longer and terminates in a large central and two smaller side apses. This is the interior intended for divine service, the church proper, while the three other halls are only halls for admission to the octagon Thus arose a general plan after the form of the Latin cross, but we must always bear in mind, that this is not a prototype of the churches of cross form, but merely a grouping of four lossely connected independent basilicas around an uncovered court. Therefore it is absolutely erroneous to assign this monument of Kelat-Seman to the group of central designs:

it certainly belongs to the class of basilicas.

Although the interiors of buildings have suffered by earthquakes, yet a reconstruction is easily made without hypotheses, since the ruins lie in place and substantial changes have never been made in the buildings. This is of great importance for the date, that the entire design agrees entirely with the description given by Evagrius in 560, between the two primary (459) and final limits (560), the analysis of the style of the building will decide for its origin in the first half of that hundred years.

The following are also to be emphasized on account of their architectural importance and peculiarities.

To the western basilica, whose front portion projects over the edge of the hill and is supported on vaults, there formerly led up a broad flight of steps, as we likewise find at other Syrian churches. The entrances are differently arranged for all these basilicas. At the western, a doorway leads to each side aisle and a wide portal, divided by three columns, opens into the middle aisle, so that a column is found on the central axis, just as at the Syrian basilica, where two doorways are separated by a part of the wall and lead into the middle aisle. Before this southern basilica is placed a vestibule(Fig. 189[78]), that opens into a larger central and two smaller side portals in front and on each side. The middle portal arch rests on columns set before the wall. Each of these entrances is characterized by a gable as being somewhat independent; the portal arch cuts into the tympanum of the middle gable considerably. Before the portion of the wall separating the portals, and which is emphasized as a pier by flutes, base and capital, projects a pilaster, that supported a column, above this at the angle of the gable is a block of returned cornice, perhaps to be taken as the support of sculptured ornamentation. Over the inner doorways is to be noted a cornice supported by consoles. Discharging arches enclosed by archivolts are to be found over all doorways, as common in Syria, their now open lunettes to be considered as once filled by perforated slabs . (Transennae). To the entrances at the ends of the basilicas are added two on each of their sides; as elsewhere, these are furnished with columnar porches, with the exception of two sides, along which extend continuous porticos. The interiors of

the basilicas exhibit columns set on pedestals, already extolled by Evagrius on account of their height and magnificence, an arrangement little employed in Syria. In the clearstories are found the little columns supported by corbels to carry the roof beams, as in Tourmanin, for example.

In the octagon is repeated the arrangement already mentioned on the southern vestibule, the great arches leading into the basilicas and into the rooms connecting the side aisles (on the diagonal sides) resting on columns set before the angle piers.

The rooms just mentioned on the diagonal sides have apses. Fig. 179 gives an illustration of the sculptured richness of the archivolts and the pilaster capitals.

## 67. Central Buildings.

Within the great monastery plan of Kelat-Seman, the mandra, is also found a central design rare among Syrian ruins, that we should perhaps regard as a baptistery (Figs. 192, 193). An octagonal interior with niches in the diagonal sides is externally extended to a square and is surrounded by four narrow side rooms; into the eastern room projects the apse enclosed in rectangular form. Above the shed roofs of these side rooms rises the octagon with its clearstory, adorned by projecting columns at the angles, both internally and externally; a hip roof with wooden framework is to be taken as covering it. The basilica directly connected on the South of the central building is perhaps to be explained as a consignatorium. (See Art. 47).

The purpose of another central building is obscure, of that in Moudjeleia (Figs. 194, 195). Before an exedra with a transverse oblong vestibule and two side rooms lies a court with a pentagonal covered columanar portico. Whether this was a hypethral design of a memorial church or a structure formerly covered (baptistery ?) cannot be decided from the statements.

The oldest and simple form of the baptistery, which did not require the apse, is most nearly approximated by the hexagon at Der-Seta (Fig. 196). The middle of the building is now concealed beneath ruins; only the positions of the six columns can be recognized. Each side of the external walls shows two windows enclosed by a moulded band extending around the building; three adjoining sides are also furnished with doorways,

that lead to a paved court with a portico; the roof is destroyed.

68. Tombs.

The important representation of the architecture of Central Syria by the likewise numerous and varied designs for sepulchral purposes. From a simple grave covered by a stone to the lofty mausoleum in the form of a tower or chapel, occur almost all kinds of tombs, both below and above ground; the labyrinth of the catacombs was alone not desired there. Next to the entirely plain single tombs may be first mentioned here those combined in a common subterranean excavation, each of which by preference took the form of an arcosolium (see Art. 5): still very modest is the Tomb of Eusebius at Kokanaya (Fig. 197) of the year 369, where a heavy stone cover, like those resting on a sarcophagus, closed the narrow shaft between the graves. The richer form of a room with doorway, down to which led a gently sloping passage, is represented by Figs. 198 to 203, where the Tomb of Sosandros in Beschindelaya (Fig. 196) of 134 shows one of the non-Christian models of this type. A vestibule with gable roof on columns was preferably placed before the sepulchral chamber.

An example of the variations of the lofty monument is given by Fig. 204; it is the form of the tegurium, of a roof supported by columns, as it again appears in the canopy of the altar, as the prototype of which, we are to regard it. According to the custom of western Asia, the termination forms a pyramid, such as Mausolus erected on his magnificent structure in Halicarnassus, or as it reappears on the so-called royal tombs near Jerusalem.

In connection with pre-Christian and pagan monuments, as represented in Syria and elsewhere by the Tomb of Jamblichus at Palmyra of 83 A. D., there was built the Christian Mausoleum of Diogenes at Hass, for example; at the same time is recalled the Mausoleum at Halacarnassus by the portico around the recessed walls of the upper story, as well as by the crowning pyramid. -- The use of two stories, likewise common in pagan mausoleums in the East, is also not rare in Syria (Figs. 208 to 210). The earnest and dignified impression produced by the solid material and the wisely distributed ornamental accessories corresponds to the purpose of the structure in a marked degree.

For the roof, the pyramid alternates with the dome and the gable roof. In Cherbet-Hass (Figs. 209 to 213), the steep gable roof, its slabs resting on transverse arches, also forms the ceiling of the building. A contrast to the closed form of the before mentioned monuments, is found in this memorial with its open interior, and which seems to be merely a protecting roof for the six massive sarcophaguses, a reminiscence of the teguriums and the memorial cells (cellae memoriae), as was likewise the custom in the West to have them open into a portico in front. (See Art. 28). We may close with two monuments beside the basilica of Roueiba (Figs. 214 to 215), whose plans are shown in Fig. 144.

# Chapter 9. Byzantine Architecture.

## a. Preliminary Steps.

### 69. Undivided Circular Buildings.

However weighty may be the numerical preponderance of the basilican design in church architecture, Early Christian architecture was not deprived of the enjoyment of the varying and ever new problems arising from central constructions. From the days of Constantine, besides that former species, there existed a series of attempts to solve the great artistic problems of central and domical architecture, likewise in the interests of the Church. So far as this concerned the solution of the task for works of small dimensions in the erection of baptisteries and tomb-chapels, we have already drawn those attempts within the field of our examination, such buildings as do not primarily represent actual community churches, but which were built as memorial structures for enclosing sacred localities, or like S. Stefano Rotondo in Rome, perhaps originated in imitation of such memorial churches.

A part of the works already mentioned belong by their ground plans to a species of structure already numerous in secular architecture, that of circular designs. The first and simplest step of this kind, most nobly developed in the Pantheon, is represented in the church architecture of the West by creations like S. Petronilla and S. Andrea, formerly beside S. Peter in Rome; to these is added in the East S. George in Thessalonica (Figs. 218, 219[86]), perhaps merely the adaptation of an antique monument. The immense wall is 19.69 ft. thick, and it is animated by eight rectangular niches, supporting a dome with a diameter of 78.72 ft., and it is entirely an antique motive, to which is added the necessary choir. The mosaic ornamentation of the dome indicates the 7 th or 8 th century.

*Note 86. From Texier & Pullan.*

### 70. Subdivided Circular Buildings.

The progress offered by the annular aisle around such a domed interior, with an arcade pierced in the lower part of the wall, is found in S. Costanza (see Art. 30) among the Early Christian monuments of Rome. It is approximated in this respect by the Cathedral of Bosra in the Hauran, in case De Vogue's hypothesis concerning the internal subdivision of the structure be correct. Fig 219 gives the plan restored by Es-

Essenwein according to De Vogue's section. The Church was dedicated to Ss.Sergius, Bacchus and Leontius, and according toan inscription was completed in 511 - 512. The externally oblong building shows in the interior a circle of fully 118. ft. diameter with an adjacent choir on the East, consisting of an apse with a rectangular anteroom as well as two rooms at the sides. At the angles of the oblong room, the principal interior is extended by apses about 24'.6 ft. wide. Other smaller niches everywhere ornament the exterior and interior of the structure (the decoratively intended jointing of the masonry is shown in Fig. 222); numerous entrances (five on each side) and windows enclosed within a triangle with the doorways, reduced in number upwards, contribute to the animation of the great surfaces of the walls.

Only the external walls and a part of the drum, the former still rising to one-third their original height and on which rests the entrance archway of the polygonal apse, are preserved, together with the choir; the entire dome and its supports have disappeared; perhaps it fell soon after completion of the work, because of weak supports; they did not dare to restore it' a miserable substitute was sought in a basilican plan, before which was built the principal apse, so that the empty interior of the central structure served as a court. Only conjectures are available concerning the position and form of those supports of the dome. a higher degree of probability is not to be attributed to De Vogue's attempt at restoration. Many things, like the piers and their arches and the low windows of the drum, find their analogies in the central Church of Esra, about to be described.

71. Subdivided Central Buildings.

Where the master at Bosra failed as a result of too great rashness in construction, by a deficient security of the mighty dome, this was undertaken a few years later by another artist of scarcely less courage in a work, which has endured uninjured for almost fourteen centuries; the Church in Constantinople dedicated to Ss. Sergius and Bacchus, preceding S. Sophia, in which the series of these endeavors attained their climax.

The ground plan on which this latter work arose was indeed a different one, yet still more difficult for the solution of the problem; the circle was abandoned as a basis for the arran-

arrangement of the supports of the dome; these were set to form an octagon, or even in a square. It is to be noted in what manner was made the transition from the octagon or square to the circular line for the bearing of the dome, either a complete or approximate hemisphere, for in this lies the chief charm of the study of these buildings, which introduced and founded Byzantine architecture.

The octagonal form of plan mentioned was common for small dimensions (baptisteries), and it was also early occasionally chosen for large churches. Already in Constantine's time arose the octagonal Church in Antioch, only partially known from literary statements, and likewise in the same country, the central design at Nazianz in Asia Minor. It is characteristic, that from the beginning, it was in the East of the empire, where the problem of central and domed construction was always taken up anew; to the masters from Miletus and Tralles was it reserved to find the best solution.

The Church S. George at Esra (Zora, West from the Hauran) is more simply constructed without galleries. (Figs. 223, 224 82). According to an inscription on the lintel of the main portal, it was completed in 515; John, son of Diomedes, dedicated it to S. George after an apparition to him. Therefore no opportunity occurs for referring the building to the series of memorial churches and thereby explaining its central ground-form. The plan was plainly influenced by the neighboring Church in Bosra just described, which was completed three years earlier. Like there, the central structure is placed within an oblong, while great rectangular enclosed niches are attached to the diagonal sides of the octagon; the choir projects on the East with the same breadth and height as the main building, the prothesis and diakonikum with an oblong space before the apse, which projects and is enclosed on three sides by a pentagon and is lighted by a single window only. Triple seats for priests are arranged in amphitheatre form around the wall of the apse; therefore the altar had its place in the room before the apse, as in the building still serving for worship. The structure is divided into the lofty central space and the octagonal aisle around it. Eight plain piers, only ornamented by simple impost mouldings support on equal arches the drum, in which occur two toothed courses. 

likewise in Bosra. Through eight low round-arched windows the light falls into the interior, which is further lighted only by the great lunettes over the doorways of the three external sides. The conically pointed dome is erected in rubble masonry. one may have some doubts of the original form of the section, but not concerning the shape of the supports, which have many analogies, partly of earlier date, within the region of Syria in question. As on the so-called Kalybe of Umm-es-Zeitun (265 A.D.), the change from the polygon to the circle is made by corbelling out slabs above the eight angles of the drum, transforming the octagon into a polygon of sixteen sides. The same process is then repeated to form a polygon of 32 sides, whose perimeter bears the circular form of the impost of the dome without difficulty. All wooden construction is avoided, the aisle and the rooms of the choir are covered by slabs, which rest on corbelled courses and at the same time form the roof of the structure. Statical safety was the sole guiding principle of the master: every ornamental accessory was omitted, excepting a moulded cornice band on the facade, which encloses as an archivolt the archways of the principal entrance, while the lintels of the side doorways only show the cross with clusters of grapes, alpha and omega; similar crosses flank the inscription on the portal previously mentioned.

Chronologically and in construction, the Church of Ss. Sergius and Bacchus in Constantinople and S. Vitale in Ravenna are to be placed directly with the Church at Esra. Both carry the problem of placing a dome over a polygon further toward its solution.

72. Ss. Sergius and Bacchus.

The master of Ss. Sergius and Bacchus (now known as Mosque Kutschuk Aja Sophia, or Little Church S. Sophia) was well acquainted with the central designs long used in the East. The system of the octagon of Antioch and Nazianz appears to have been adopted here, and it was doubtless placed on a higher plane statically (Figs. 225, 226). According to the statements of the contemporary writer Procopius, the building was commenced in the year 527, placed beside a second church, now entirely destroyed. The atrium was common to both, the difference seems to have chiefly been, that the destroyed

church had less height, and therefore no dome, and consequently a more extended and not a centralized plan. Ss. Sergius & Bacchus is similar to the Church at Esra in having the internal octagon exactly a square, which becomes an oblong by including the narthex. The apse of the choir also projects here and is enclosed by three sides of a polygon. The octagonal aisle is not plain here, but it is richly and variously subdivided in plan and construction. With the exception of the opening before the choir, there are set two columns between each two piers of the octagon, and these support a horizontal entablature and a second pair of columns above this: the latter are connected together and with the piers by round arches to support the semicircular walls or half domes adjoining the pier arches. For on the diagonal sides of the octagon, the pair of columns are set back in a semicircle, so that niches project into the outer aisle. Thus as already earlier in the octagon at Antioch, that alternation of recesses and exedras, i.e., of rectangular side rooms and apses is produced, which in other plans with the similar basal system, is given up to secure the arrangement of apses alone (S. Vitale and others). The entablature above the lower columns still bears the dedicatory inscription extending around the entire central space. In the apse of the choir, the arrangement of windows in two stories is notable, and which is repeated in S. Sophia. The transition above the octagon of piers to the circular impost is made by eight pendentives in the angles (spherical triangles). The architect has likewise not utilized the possibility of turning a true hemisphere over the internal space: he rather erected sixteen ribs of quadrant curve and meeting at the crown, between which he then constructed sixteen swelled vaults intersecting in sharp groins. Sixteen side arches intersect these, each alternate one of which contains a window.

78. S. Vitale.

As nearly allied to this building appears S. Vitale in Ravenna (Figs. 227 to 231). The relations with Byzantium are well known. Julianus Argentarius, the treasurer, had the church commenced in 526 (or between 541 and 546, in case the era of bishop Ecclesius is only to be placed in those years; it was consecrated in 547), portraits of Justinian, Theodora, and of their courtiers on both sides, adorn the walls of the

choir; the hands of Byzantine marble workers guided the chisels on the very peculiar capitals of the columns, but the plan and superstructure of the church, particularly indicate its place beside Ss. Sergius and Bacchus and the allied structures. Instead of the alternation of rectangular and apsidal niches about the central space, S. Vitale indeed possesses exedras in two stories, which are only interrupted before the choir apse by a square, which is entirely opened toward the octagon, but it shows at the sides semicircular side walls supported by two columns, each with a triple arcade of columns. The entablature is replaced by the arch above all columns, and which is first received on an impost block.

The transition from the octagon to the circle beneath the dome is here effected by small recessed arches placed in the angles (now plastered and painted). The dome is a hemisphere and is pierced by eight round arched windows; as the material for the dome there are again employed hollow clay vessels, much liked in Ravenna, set spirally as shown by the Baptistery near the Cathedral and others. In contrast to the later Byzantine buildings, the dome does not appear externally, but as at the Baptistery, its lower portion is enclosed by an octagonal wall and then covered by a hip roof. Not merely by the rising of the central structure above the outer aisle in two stories, which is strengthened by projections from the piers, but also by the grouping of the choir, the outline of the whole appears very rich: the rooms beside the apse are formed as circular structures with rectangular projections: likewise circular are the staircase towers of the western side, whose oblique position with reference to the main axis was indeed compelled by the course of the street. In the interior of the building, of the formerly universal and richly colored decoration, the entire ornamentation of the choir has been preserved as a jewel of harmonious mosaic decoration. The meaning of the other ornamentation, especially that of the dome, is unknown; perhaps as Procopius states concerning the churches of Constantinople, this consisted of a golden sheen without figures' the vertical surfaces of the walls and piers were veneered with brightly colored stone. The pavement was raised later, so that the bases of the columns are now concealed.

*Note 89. From Garucci.*

Surprising in the West are the novel forms and sculptures of the capitals of the lower columns. The block shape with slightly convex sides, diminished downward and shown by imposts elsewhere, originated in Byzantium and has now been transferred to the capital of the column; the antique tradition is here consciously and thoroughly abandoned. The middle space with a flower is enclosed by a straight border, which is based on filagree-like interlaced work. The abrupt separation and almost entire independence of the surfaces is characteristic here. The sharp and dry treatment is likewise exhibited by the Composite capitals of the upper columns with their imposts in relief.

74. Palace Chapel at Aix-la-Chapelle.

The Palace Chapel of Charlemagne at Aix-la-Chapelle (Figs. 234, 235) may be mentioned here as an interesting structure on account of its evident structural relations to S. Vitale. The internal octagon is surrounded by a polygon of sixteen sides, adjoining which on the West is a vestibule flanked by 2 staircase towers, ending in shallow niches with galleries; while at the East is perhaps to be assumed a choir, that was later supplanted by the existing Gothic building. Bold piers stand at the angles of the lofty octagon; above the semicircular arches of the lower story rise the high arches of the gallery, against which abut the rampant tunnel vaults. The arrangement of two columns within the arches has no structural, but merely a decorative purpose. Round-arched windows over the arched openings admit direct light to the central space. An octagonal dome spans this, which is covered by a hip roof, as at S. Vitale. Pilaster-like projections at the angles aid in opposing the thrust of the dome. In the galleries are still preserved the ancient bronze grilles. (Figs. 236 to 238[89]). Everything further will be explained in the description of the true mediaeval architecture.

*Note 89. From Aus'm Weerth. Kunstdenkmäler des christlichen Mittelalters in den Rhinelanden. Vol. 1. Leipzig. 1857.*

b. Church S. Sophia[90]

75. Church S. Sophia.

"I have excelled thee, O Solomon!" With these words of pride and joy, Justinian greeted the completion of the work, which was called to represent for Early Christian architecture the

climax in the development of central and domical construction. The emperor might compare himself to the builder of the Temple of Jerusalem, when he was overpowered by the blinding sheen, that streamed down from that dome, which seemed to soar above the interior with a span and height hitherto unknown, only supported by four piers and arches.

A glance at the plan and longitudinal section of the church shows how central and longitudinal construction are united in a singular way in this monument.(See the adjoining Plate and Fig. 239[91]). The external walls enclose a nearly square interior, in which again is emphasized a central square, and this middle is marked as the centre of the dome dominating everything. Likewise is grouped the remainder around the centre, but not at all subordinate. Adjacent at the sides are side aisles, whose galleries are supported on arcades, like the tympanum walls above them; but at the East and West, the interior expands without restraint into mighty apses, which in their turn are further extended by three niches. Thus the parallel basilican division appears joined with the central construction, cluminating in height in a single apex. But this ingenious combination is not the sole astonishing part of the design. Likewise here for the first time is made the experiment of vaulting a square interior by means of four pendentives with a spherical dome over the inscribed circle (carried out in dimensions only exceeded after the lapse of a thousand years). Four semicircular arches are turned between piers erected 98.4 ft. apart, with the spherical triangles between them, these directly receive the springing of the dome. The side thrust of the latter is received on the East and West by the great exedras built against the arches; it is opposed on the other sides by the colossal enlargement of the piers themselves, which really form a single solid mass, though penetrated by wide arched passages. This massiveness is plainly visible on the exterior of the structure.

*Note 91. From Salzenberg.*

The building was planned by keen intellects and constructed with genius, and it was the work of two masters from Asia Minor, Anthemios of Tralles and Isidorus of Miletus. They were called in 532 by Justinian, when during the Nika insurrection the ancient Church of S. Sophia, the Church of the Divine Wisdom and

planned as a basilica, was destroyed by fire. After five years, Justinian was already aple to dedicate the new structure. When the dome was destroyed in 558 by an earthquake, the emperor decided to have the work rebuilt by the younger Isodorus, nephew of the one previously mentioned. Procopius, who has left us a detailed book on all architectural undertakings of Justinian, as Paulus Silentiarus has likewise written, describes fully the latter in poetical form, the wonderful work, that reasearch in recent times has made known to us from Salzenberg's drawings on occasion of some restorations executed by the Italian Fossati about the middle of the 19 th century. Until the year 1453, the church was used for the Greek rite, it has since ben a mosque. The altered purpose has caused some changes of no importance architecturally: the addition of four slender minarets is one, the most striking to the eye. The rich decorations of the interior fared worse, where all figure ornament was covered with whitewash, and verses from the Koran on shields of shapeless form were hung up.

Entirely undivided surfaces of the dome were also renounced by the masters of the Church of S. Sophia, as well as by their contemporaries at S. Vitale, or Ss. Sergius and Bacchus. Instead of erecting a drum pierced with numerous windows beneath the dome for the high side light of the central space, as in later Byzantine architecture, the dome itself was furnished with a circle of windows. Beginning at the base of the dome and covered by round arches, they intersect it in forty compartments built between as many meridian ribs or arches, that form the secure skeleton of the entire dome. By the vaulting over the windows, the meridian arches are firmly united, and buttresses projecting at their ends in the form of small inclined piers further ensure the safety of the construction.

The lighting is nevertheless not in the smallest degree limited to this circle of windows, soaring like a chandelier over the interior. The great lunette side walls are also pierced by two tiers of windows above each other, whose heights harmonize with the outline of the lunettes. A series of blind niches complete the subdivision of the great surfaces, to the animation of which the figure ornamentation of the mosaics essentially contributed. No less abundantly are all other parts lighted. The half domes of all large and small apses are each

pierced by five windows; wide and tall windows finally admit light through all walls of the choir as well as of the side aisles (Fig. 248[92]); we collect here for comparison some perforated window slabs from Italian churches. (Figs. 249 to 244). The side aisles have galleries, that are indeed interrupted at the East and the West, but on the latter side are again connected by the great vaulted corridor, opening into the church by arcades, and which extends like a foyer above the inner vestibule. The massive columns supporting the galleries are higher and also spaced more widely, than the upper and closer ones, upon which rest the vaults of the apses and the lunette walls. The veneering of the walls has been largely preserved; but the rich furniture of the choir, the altar and the ambo supported on columns with the elevated passage or soleas, we know only from the poetical description by Paulus Silentiarus. --- The peculiar treatment of the details in relief on capitals, friezes, etc., already noted at S. Vitale in Ravenna, finds its most complete expression in S. Sophia.

*Note 92. From Hübsch.*

The exterior forms at first a striking contrast to the splendor and richness of the interior. (See the adjacent Plates). The massive expedients liberally employed to ensure the security of the construction are here visible, undisguised and without any ornamental accessories. Like a mighty mountain of stone, the mass appears to rise heavily, the walls of the central structure and its piers present themselves in undivided form. Yet in ancient times this impression was lessened or even removed, by the fact that the church did not stand isolated, but it appeared entirely enclosed by the imperial palace with its rich combination of buildings of the most varied purposes and the most diverse architectural effect. There remain today only the ruins of the former atrium of the church itself and the exonarthek, i.e., the doubling of the vestibule, a characteristic in Byzantine architecture; four broad piers project from this and perhaps formerly supported equestrian statues.

Of all the creations of the abundant architectural activity of Justinian in Constantinople, S. Sophia alone has endured for the centuries. For the great series of lost monuments, the descriptions of Procopius afford only an insufficient substitute. At best, they suffice to prove the predominance of the central

and domical construction now beginning, at first least for important monumental designs. The centralized arrangement of the plan is therefore less the merit of the period of Justinian, than far more the consistent development of vaulted construction, which in its way must naturally influence the more commonly and longer employed central design by the requirements of construction. To follow this out in detail, for example, on the Church of the Apostles in Constantinople, is only possible in outline. We know that Constantine already took the cross form as a basis in the Church of Apostles, which he founded in his new capital and intended as an imperial mausoleum: but the roofs and ceilings were common in non-vaulted basilican architecture. The ruinous church was replaced by a new structure by Justinian, which exhibits the utilization of the results obtained in S. Sophia. The words of Procopius have always been erroneously interpreted in previous attempts at restoration, but they clearly speak of the basal form of the Latin cross. Two straight lines, as they are termed in his somewhat circumstantial description of the ground plan, were joined together at the centre in cross form; the principal line was directed from sunrise to sunset, the other being transversely from North to South. The two ends of the latter are designated as equal to each other, while he says of the principal line, that the part toward the sunset was made so much greater than the other, as the creation of the cross plan required. The building apparently possessed no apse; for the crossing is expressly designated as the location of the choir. Concerning the superstructure, we learn that upper and lower columns were to be found in all the arms of the cross, and that galleries extended along all the walls. The covering of the interior was based on the scheme tested in S. Sophia, commenced four years earlier. Six domes arose without drums, supported by side arches and pendentives, and only the dome over the crossing was pierced by a circle of windows at its base.

An imitation of this building was found in the Church S. John at Ephesus, likewise founded by Justinian, of which we have no further information.

### c. Later Development of Byzantine Architecture.

#### 76. Later Byzantine Churches.

The time for writing a history of Byzantine architecture has

not yet arrived. The material is indeed not absolutely wanting; but the little made known by research, in comparison with a period of time lasting a thousand years and more, is of little more significance than a collection of scattered stones, which cannot unite to form a complete whole. To extend this is the present work of science; until this has led to tangible results, one must be satisfied to consider the laready known monuments and their peculiarities, which will be briefly stated in the following.

A purely central structure without change is found in the buildings succeeding S. Sophia just as little, as in that structure itself. Even if the square predominates in the arrangement of the plan in the main portion of the church, this is extended into a rectangle by the attached choir and the frequently doubled narthex. ôut even the principal building itself exhibits in numerous examples the same combination of central and longitudinal construction, as in the church S. Sophia. High over the centre soars the circular dome, borne by the four pendentives between the side arches, the mighty culmination in height, to which all else is subordinated; but of the rooms adjoining this middle square, only those on the East and West are developed freely and without limitation; broad tunnel vaults adjoin it on both sides as direct extensions of the side arches beneath the dome, supported by walls or arcades, a room with tunnel vault before the apse, and finally this so much enlarges the entirely open space, that the side rooms nowhere appear as similarly treated, or as northern and southern transepts of equal prominence, but they ar- always subdivided, like the side aisles of the basilica.

The Church near Cassaba in Lydia (Fig. 243 [93]), the Church S. Clement at Ancyra (Angora, Fig. 244 [93]), the Church S. Nicolaus at Myra (Fig. 247 [94]), and the Church S. Sophia at Thessalonica (Figs. 248 to 250) þrove this. The apse always projects, sometimes circular in ancient fashion, sometimes polygonal, sometimes enclosed within a rectangle. Protbesis and diakonikon accompany it in smaller dimensions, arranged in direct connection with not merely the main interior, but with direct access from the vestibule of the apse. The colonnade with entablature, which is also found here as an addition to the simple

railing at the entrance of the choir (for example, in Myra), was closed in the course of time to form a true iconostasis, a solid wall with figures, which was not temporary like the movable curtains of the canopy over the altar, temporarily drawn during certain functions, but this permanently concealed the sanctuary and its ceremonies from the eyes of the multitude. Likewise a considerable enlargement of niches of the four walls and a small dome sometimes mark the prothesis and the diakonikum as ornamental central rooms. (compare those in Cassaba and Ancyra).

*Note 93. From Salzenberg.*

*Note 94. From Texier and Pullan.*

The Church S. Irene in Constantinople goes yet further in concessions to longitudinal construction (Figs. 257, 252). Much in the building, restored in the 8 th century by Leo the Isaurian, may be referred to the earlier foundation of Justinian, which in its turn already had a predecessor from the time of Constantine (now Museum of Arms). The eastern half of the church, with its choir, dome with circle of windows, and the galleries, presents no novel peculiarity' on the other hand, the elongation toward the West is not merely by a tunnel vaulted room of moderate depth, but by a nearly square interior covered by a dome approximating to an oval in plan with a slightly depressed section, which is subordinate to the Eastern in height and omits the windows. Abundant admission of light is provided in the external walls, which as at S. Sophia, show in a frightfully tasteless way the structural skeleton of piers and arches. Also as at S. Sophia, broad passages are arranged through the former to connect the side aisles.

The galleries are then more and more omitted in the structure, or are limited to a single one over the inner narthex. They entirely disappear after that system begins to be adopted, that we shall briefly designate as the plan with four columns. The four columns, which area satisfactory substitute for the stumpy piers in case of the usually modest dimensions, mark the angles of the middle square, there rise from them the slender and frequently stilted arches to bear the dome in connection with the pendentives . The height of the interior is therefore more increased by the drum or cylindrical wall adorned by windows,

that now rises high and supports the dome as a true hemisphere.

Uniform in height and width, without colonnades, gables or lunette walls, four cross arms adjoin this middle square. They are covered by tunnel vaults, while the four small square rooms placed in the angles between each two of the cross arms are rather completed by a dome.

A row of such small domes also indeed covers the narthex, an arrangement likewise imitated by S. Marco in Venice (Fig. 253), the finest example of a western imitation of Byzantine architecture.

The Church S. Bardias at Thessalonica (Figs. 254, 255), the Church Theotokos at Constantinople (Figs. 256 to 259), the Church Pantocrator there (Fig. 260), also the Church Apostles in Thessalonica (Figs. 262, 263), the Church S. Sophia in Trapezuntum (Figs. 264 to 266), and the Cathedral there (Fig. 269), the Church Panagia Gorgopiko (the old Cathedral) in Athens (Figs. 267, 8 268) and other old churches there (Figs. 267 to 277) may be mentioned here as examples, to which may are added as descendants in the West, for example, the Church Martorano in Palermo (Fig. 274), the Church Cattolica in Stilo and others. Simplified and triapsal appears the principal interior in Church S. Elias in Thessalonica (Figs. 272, 273), without side rooms, the Church in Studenica in Servia (see adjacent Plate); other variations are presented by Ravanica (Fig. 275), Krusevac (Fig. 276), or Semendria (Fig. 277).

~~Note 90. From Hübsch~~.

~~Note 91. From Gailhabaud~~.

In the appearance of the exterior, the important prominence of the dome is most striking. It is frequently elevated by the very high and externally polygonal drum, dominating the remainder of the building. Its base is not marked by an encircling horizontal member; the round arches rather cut into its lower surface, rising from the slender, often band-like, columns at the angles of the drum, sometimes enclosing the separate sides of the polygon with bold mouldings. The windows placed therein shrink in the course of time to long and narrow slits, furnished with perforated slabs (transennae). The tiles covering the dome allow its hemispherical form to plainly appear; a hip roof is occasionally built over the dome. --- While at the

Church S. Sophia, all other parts, whether half domes, tunnel vaults, or some other forms, permit the contours of the ceiling of the interior to appear without disguise; gable or shed roofs were later erected over them; we find the former over the arms of the cross, the latter adjoin them over the angle rooms. The walls are externally preferably in several colors, especially built in red and yellow courses; the old Cathedral Metropolis in Athens (Fig. 265[92]) also has a series of antique and partly Byzantine reliefs as an ornament of the exterior.

As an example of the later bizarre degeneration and the influence of foreign elements may be mentioned in conclusion the Church at Kurtea d'Argysch (in Roumania), erected in the 16 th century. (Figs. 276 to 280[92]).

~~Note 92. From Reissenberger, L. Die Bischöfliche Klosterkirkirche zu Kurtea~~ *d'Argysch. Jahrb. d. K. K. centralcommission f* ~~für Baudenkmale. Vol. V. (1860)~~*. p. 175.*

The costly mosaic disappeared more and more from the interior, which the period of Justinian lavishly employed, to give place to plaster and rich painting, that became petrified in significance and form in a canon embodied in fixed rules, employed till the present day in the Greek Church, as shown by a comparison of the modern and almost artisan-like undertakings of the monkish artists with the directions, for example, as they are given in the book for painters from Mt. Athos.

Aside from the previously mentioned incompleteness of the materials, it would far exceed the limits of the theme to be treated in this half volume, were we to desire to follow Byzantine architecture beyond the bounds of the Early Christian period down into the middle ages and into the modern period. Only may one desire to indicate the brief systematic sketches just given, that reach the climax of Byzantine architecture with the work of genius in the creation of S. Sophia, but not to summarize any further development. This style indeed has never found the freedom, that is found in the development of the western central architecture in the Renaissance period; the entire separation of the civilization in the domains of the Greek and Roman churches hermetically sealed the former against the richly pulsating art life of the western middle ages, and the recently won races of the Servians, Bulgarians, Armenians, Russians, and others, chiefly receive and rarely give.

Church S. Sophia, all other parts, whether half domes, tunnel vaults, or some other forms, permit the contours of the ceiling of the interior to appear without disguise; gable or shed roofs were later erected over them; we find the former over the arms of the cross, the latter adjoin them over the angle rooms. The walls are externally preferably in several colors, especially built in red and yellow courses; the old Cathedral Metropolis in Athens (Fig. 267 [92]) also has a series of antique and partly Byzantine reliefs as an ornament of the exterior.

As an example of the later bizarre degeneration and the influence of foreign elements may be mentioned in conclusion the Church at Kurtea d'Argysch (in Roumania), erected in the 16 th century. (Figs. 278 to 280 [92]).

*Note 92. From Reissenberger, L. Die Bischöfliche Klosterkirche zu Kurtea d'Argysch. Jahrb. d. K. K. centralcommission f für Baudenkmale. Vol. V. (1860). p. 175.*

The costly mosaic disappeared more and more from the interior, which the period of Justinian lavishly employed, to give place to plaster and rich painting, that became petrified in significance and form in a canon embodied in fixed rules, employed till the present day in the Greek Church, as shown by a comparison of the modern and almost artisan-like undertakings of the monkish artists with the directions, for example, as they are given in the book for painters from Mt. Athos.

Aside from the previously mentioned incompleteness of the materials, it would far exceed the limits of the theme to be treated in this half volume, were we to desire to follow Byzantine architecture beyond the bounds of the Early Christian period down into the middle ages and into the modern period. Only may one desire to indicate the brief systematic sketches just given, that reach the climax of Byzantine architecture with the work of genius in the creation of S. Sophia, but not to summarize any further development. This style indeed has never found the freedom, that is found in the development of the western central architecture in the Renaissance period; the entire separation of the civilization in the domains of the Greek and Roman churches hermetically sealed the former against the richly pulsating art life of the western middle ages, and the recently won races of the Servians, Bulgarians, Armenians, Russians, and others, chiefly receive and rarely give.

# BIBLIOGRAPHY.

## 1. General Description.

### a. Systematic.

Holtzinger, H. Die altchristliche Architektur in systematischer Darstellung. Form, arrangement and decoration of Early Chrestian Churches, Baptisteries and Sepulchral Buildings. Stuttgart. 1889.

### b. Collections of Illustrations of more important Monuments.

Ciampini, J. Vetera monimenta. Rome. 1690 - 1699.

Ciampini, J. Synopsis historica de sacris aedificiis a Constantino Magno constructis. Rome. 1693.

Canina, L. Ricerce sull' architettura piu propria dei tempii cristiani etc. Rome. 1843.

Hübsch, H. Die altchristlichen Kirchen etc. Carlsruhe. 1858-63.

### c. Altchristliche Architecture of the West.

Dehio, G. & G. von Bezold. Die kirchliche Baukunst des Abendlandes. I. Stuttgart. 1884.

Mothes, O. Die Baukunst des mittelalters in Italien, etc. Jena. 1882 - 1884.

Schultze, V. Die Katakomben. Die altchristliche Gräbstatten. Leipzig. 1882.

Kraus, F. X. Roma sotteranea. The Roman Catacombs. Freiberg. 1872 - 1873. 2 nd edition, 1879.

Armellini, M. Le catacombe di Roma e d'Italia. Rome. 1893.

Cattaneo, R. L'architettura in Italia dal secolo VI al mille circa. Venice. 1888.

Dartein, M. F. de. Etude sur l'architecture lombarde, etc. Paris. 1865 - 1866.

### d. Early Christian Architecture of the East.

Isabelle, Ch. E. Les edifices circulaires et les domes. Paris. 1853 - 1855.

Texier, Ch. & R. P. Pullan. Byzantine Architecture. London. 1843 - 1864.

Choisy, A. L'art de batir chez les Byzantins. Paris. 1883.

Rahn, J. R. Ueber den Ursprung und die Entwickelung des christlichen Central- und Kuppelbaues. Leipzig. 1866.

Unger. Quellen zur byzantinischen Kunstgeschichte. Vienna. 1874 and 1898.

Bayet. L'Art Byzantin. Paris. 1885.

Lenoir, A. Instruction sur l'Architecture Monastique au Moyen=Age. Paris. 1852 - 1856.

Couchaud, A. Choix d'Eglises Byzantines en Grece. Paris. 1841 - 1842.

Blouet, A. Expedition Scientifique de Moree. Paris. 1831.

Vogue, M. de. La Syrie Centrale. Architecture civile et religieuse. Paris. 1865.

Texier, Ch. F. M. Description de l'Armenie, de la Perse, et de la Mesopotamie. Paris. 1840 - 1852.

e. Northern Africa.

Description de l'Algerie. Paris. 1854 et seq.

Vigneral, Ch. de. Ruines Romaines de l'Algerie. Paris. 1868.

Dupuch. L'Algerie Chretienne.

Gsell. Recherches Archaeologiques en Algerie. Paris. 1893.

Diehl, Ch. L'Afrique Byzantine. Paris. 1897.

Description de l'Egypte. Paris. 1832.

Butler, A. J. The Ancient Coptic Churches of Egypt. Oxford. 1885.

2. Bibliography of the Question of the Origin of of Ecclesiastical Buildings.

Sarnelli, P. Antica Basilicografia. Naples. 1686.

Zestermann, A. Ch. A. Die Antiken und die Christilchen Basiliken. Leipzig. 1847.

Urlichs, C. L. Die Apsis der alten Basiliken. Greifswald. 1847.

Von Quast, A. F. Ueber Form, Einrichtung und Ausschmuckung der ältesten Christilchen Kirchen. Berlin. 1853.

Messmer, J. A. Ueber den Ursprung, die Entwickelung und Bedeutung der Basilika in der Christlichen Baukunst. Leipzig. 1854.

Weingärtner, W. Ursprung und Entwickelung des Christlichen Kirchengebäudes. Leipzig. 1858.

Messmer, J. A. Ueber den Ursprung der Christlichen Basilika. Zeits. für Christl. Archaeol. II. (1859).

Mothes, O. Die Basilikenform bei den Christen der ersten Jahrhunderte. Leipzig. 1865.

Reber, F. Ueber die Urform der Römischen Basilika. Mitt.der Centralcommission. Regensburg. 1874.

Stockbauer, J. Der Christliche Kërchenbau in den ersten sechs Jahrhunderten. Regensburg. 1874.
Richter, J. P. Der Ursprung der abendländischen Kirchengebäude. Vienna. 1878.
Holtzinger, H. Die Römische Privatbasilika. Report. für Kunstw. V. (1882).
Schultze, V. Der Ursprung des Christlichen Kirchengabäuden. Chrisl. Kunstb. 1882.
Dehio, G. Die Genesis der Christlichen Barilika. Sitzb. der Hist. Classe der K. Bair. Akad. der Wiss. 1882.
Lange, K. Haus und Halle. Leipzig. 1885.
Holtzinger, H. Kunsthistorische Studien I. Die Entstehung des abendländischen Kirchengabäudes. Tübingen. 1886

3. Monographs on the more important vonuments.

a. Rome.

Bunsen, Gutensohn & Knapp. Die Basiliken des Christlichen Roms. Stuttgart. 1822.
De Rossi, G. B. I mosaici delle Chiese di Roma. Rome. 1878 e.s.
Bosio, A. Roma sotterranea. Rome. 1632.
Aringhi, P. Roma sotterranea. Rome. 1651.
Marchi. Monumenti primativi delle Arti Cristiani, etc. I. L'Architettura della Roma sotterranea Cristiana . Rome. 1844.
De Rossi, G. B. Roma sotterranea Cristiana. I - III. Rome. 1864 - 1877.
Roller, Th. Les Catacombes de Rome. Paris. 1881.
Armellini, M. Le Chiese di Roma. Rome. 1887.
Holtzinger, H. Altchristliche Basiliken in Rom und Ravenna. Berlin. 1898. (Die Baukunst, Heft. 4).

b. Ravenna.

von Quast, A. F. Die altchristlichen Bauwerke von Ravenna etc. Berlin. 1842.
Rahn, R. Ravenna. Eine kunsthistorische Studie. Leipzig. 1869.
Ricci, C. Ravenna e i suoi Dintorni. Ravenna. 1878.
Holtzinger, H. Altchristliche Basiliken in Rom und Ravenna. Berlin. 1898. (Die Baukunste, Heft. 4).

c. Milan.

Kothe. S. Lorenzo in Mailand. Berlin. 1895.
Rotta, P. Sulle sette antiche basiliche stazionali di Milano. Milan. 1882.

d. Nola.

Holtzinger, H. Die Basilika des Paulinus in Nola. Zeits. für Bildende Künste. 1887.

e. Parenzo.

Lohde. Der Dom zu Parenzo. Berlin. 1859. (Aus Zeits. für Bauw. Vol. 9.

Amoroso, A. Le Basiliche cristiane di Parenzo. Parenzo. 1891.

f. Treves.

von Wilmowski, J. N. Der Dom zu Trier, etc. Treves. 1874.

g. Tours.

Quicherat. Restitution de St. Martin de Tours. Paris. 1870.

Lasteyrie. St. Martin de Tours. Paris. 1890.

Dehio. Die Basilika des heiligen Martin in Tours. Jahrb. d. Preuss. Kunstsamml. X.

Chevalier. Le Tombeau de St. Martin a Tours. Tours. 1880.

h. Constantinople.

Salzenberg, W. Altchristliche Baudenkmale Constantinopels vom V. bis XII Jahrhundert. Berlin. 1854.

Pulgher, D. Les anciennes Eglises Byzantines de Constantinople. Vienna. 1878.

Holtzinger, H. Die Sophienkirche in Constantinople und verwandte Bauten der Byzantinischen Architektur. Berlin. 1898. (Die Baukunst", Heft. 8).

HANDBOOK OF ARCHITECTURE

Part II

ARCHITECTURAL STYLES

Volume 3; Part 2

# MOHAMMEDAN ARCHITECTURE

By Julius Franz-Pacha

Second Edition

DARMSTADT

1896

Translated by N. Clifford Ricker. D. Arch.

Professor of Architecture

UNIVERSITY OF ILLINOIS

Urbana. Ill.

1906

# HANDBOOK OF ARCHITECTURE.

## Part II.
## ARCHITECTURAL STYLES.



## Division 2.
## MEDIAEVAL ARCHITECTURE.

## Volume 3. Second Half.

# DIVISION II. MEDIAEVAL ARCHITECTURE.

## Section 2. Mohammedan Architecture.

### Chapter 1. Introduction and Historical Survey.

"The Christian people were not the only ones , that took possession of Roman architectural traditions, to develop them in a new spirit. Before we can devote our attention to the further course of this important process of development, we must consider another group of peoples, which likewise under the impulse of a new religious system, labored in an especial manner for the improvement of the great legacy of antique architecture. But many elements of Early Christian architecture were already mingled therewith, and especially from the Byzantine style, which was combined with what the Mohammedan peoples had of their own spiritual purport, and they impressed upon this style of architecture a very peculiar and mixed character." Lübke. Geschichte der Architektur. 6 th ed. p.425.

"The Arabs indeed borrowed in their art creations from the buildings, that they found in Syria, yet they developed their own world of form ........" Socinus in Badeker's Palestine.

§. 1. Introductory and Historical.

At the beginning of the 7 th century of our era, tendencies made themselves apparent in the religious life of the Arabs, which were chiefly opposed to the prevailing polytheism. Belief in a single Deity took the place of the worship of gods; monotheism supplanted polytheism. The new faith found in Mohammed, -- the epileptic son of Abdallah of the Haschim family, a less prominent branch of the noble race of Koreish,that had settled in Mecca and took charge of the famous temple of the deity there, the Caaba, -- a bold champion, who in consequence of a vision made them known with glowing inspiration.

"There is no god but God, and Mohammed is the prophet of God!"

Belief in angels, revelations and prophets, in a resurrection, in a last judgement and in an eternal life, as well as in predestination were included therewith.

Paganism was regarded as the product of ignorance and folly, the rigor of ethics in Judaism and Christianity, that produced a multitude of empty forms, was blamed and rejected by Mohammed, and the doctrine of the Trinity in Christianity was con-

condemned as polytheism.

As he himself said, his revelation was not new; his religion was very ancient, and every man was still ideally born as a Mohammedan; his surroundings alone made him different. Every one was bound to believe the new faith, and every Mohammedan was required to propagate it. Mohammed termed his religion "Islam", i.e., Submission to God.

He at first found adherents only in his own family, and only after his flight and expatriation to Medina did the new faith make notable progress, and first in that city. The truth of the ancient proverb about the prophet and his own country was experienced by Mohammed. Yet he at last succeeded in winning the Bedouins to his faith, in uniting them politically, in conquering Mecca, and in destroying the ancient idols.[1]

*Note 1. See Socin. Religion of Islam in Baedeker's Lower Egypt and Peninsula of Sinai. 3 rd edit. p. lxix - lxxxi. Leipzig. 1894.*

After the death of Mohammed in 632 (June 8 th), his father-in-law Abu-Bekr was chosen Caliph by the adherents, and he placed himself at the head of the movement. For those who faithfully performed the duty of propagating the faith, the sword must finish what the power of speech could not accomplish.

Thereby and by its intellectual character, as well as by its internal sound elements, the new religion spread with great rapidity; with the national peculiarities of the first followers it created "on the one hand a chivalrous and adventurous life, that in many ways recalls the Christian middle ages, on the other hand a high stage of culture, especially of the natural sciences, mathematics, poetry, as well as of useful agriculture."

But a few years after taking possession of Mecca and in the first century after the Flight, Damascus, Jerusalem, Aleppo and Antioch were conquered, Memphis and Alexandria were garrisoned, Arab tribes settled in the valley of the Nile and founded Fostat, the Persian capital was taken by storm, its splendid buildings making a powerful impression on the conquerors, and the Sassanian empire fell into the hands of the victors.

The Ommyades, sprung from the ancient aristocracy of Mecca, sought to establish in Jerusalem a sanctuary in competition with the Caaba in Mecca. Mohammed commanded the believers, before he broke with the Jews, to turn towards Jerusalem during prayer, and the Haram of Jerusalem is the holiest place to the Mohammedan after Mecca.

Twelve years after the death of Mohammed were conquered Persia, Armenia, and Mesopotamia; in twenty years more, Rhodes and all Cyrenaica were in the possession of the Mohammedans. The Caliph's generals extended their campaigns as far as Samarcand and the borders of China.

With the transfer of the seat of the Caliphate to Damascus ceased the patriarchal form of the empire, and Meccan aristocrats thenceforward ruled the broad domain of the believers.

About the end of the first Hegira,[2] the adherents of Islam passed over into Spain(710 - 711 A.D.), subjugated the country to the Pyrenees, and the last Omnyade, Abd-er-Rahman, founded the Caliphate of Cordova.

*Note 2. To change a year in our chronology into a year in Mohammedan chronology, deduct from the former the number 622, divide the remainder by 33 and add the quotient to the number divided; the result is indeed not absolutely correct. Thus for example, the year 1291 (Mohammedan) began on Feb. 6, 1875. (A. D.). (Compare Socin). Also see Wüstenfeld, F. Vergleichungs Tabellen der Muhammedanischen und Christlichen Zeitrechnung, etc. Leipzig. 1854.*

The Frankish empire must bow before the cerscent, but Charles Martel stayed the victorious course of the Mohammedans on Catalan fields; their commander lost the decisive battle and his life, after a combat of several days under the walls of the burning city of Tours. Richly laden with booty but in wild flight, the hordes of Abd-er-Rahman hastened to the Pyrenees; German Europe was saved from the hostile inundation and from servitude.

Though France could not be held, the Arabs prepared themselves to remain in Spain, and at the close of the 2 nd Hegira, (827 A.D.) also settled in Sicily.

In the year 762 A. D., the Abbasside Almanzor transferred his residence from Damascus to Bagdad, thus ending the purely

Arab period, which was terminated by the increasing influence of foreigners and by the final overthrow of the Caliphate by the Mongols.

Spain made itself an independent caliphate, which was followed by other independent princes in Mesopotamia, Persia, and India; Touloun likewise purchased his independence in Egypt. The Fatimide Mu'izz transferred the government to Egypt in 969 A. D. and founded his new residence city not far from Fostat, the modern Cairo. The entire trade of India and of the interior of Africa was brought through Egypt by him. Arts and sciences rose to a height never anticipated; public buildings competed in magnificence of their appointments with the private structures of rulers and of the great. The strong political unity of the adherents of Islam was broked; they became more lawless, when in 1031 A. D., the Spanish Caliphate was divided into a number of lesser kingdoms.

Even commerce with the western princes and peoples could not close the rift again, and the fanaticism of the Turkish Seldjuks ruling in Syria (prisoners of war from Turkestan forming the life-guard of the Calich ) led European chivalry into the country for embittered wars (1095 A. D.). The Mohammedans were driven out of Sicily, the kingdom of Jerusalem was founded by Godfrey de Bouillon, and Toledo was retaken by Alfonso of Castile.

*Note 8. Seldjuk, a bold leader of the freebooters of the Turkish Grand Duke of Peighu (in the modern country of the Kirghis) left the service of that prince and took up his residence in the domain of the Oghus about 1000 A. D. The Seldjuks rose about 1030, the hordes of Seldjuk in connection with other Turkish tribes extended their sway to the western and northern provinces, and in 1048 fought with the Byzantines.*

The fortune of war in the succeeding wars with the crusaders (1147 and 1189 A. D.) made Saladin the master of Palestine, who drove the Christians out of the country again. The Mohammedans had the same good fortune against the campaigns of the Franks under Louis the Saint, who ended his undertakings by imprisonment and death under the walls of Tunis.

A more dangerous enemy than the crusaders descended from the table lands of Tartary, and menaced in the Mongolian hordes under Genghis Khan, who fell upon China, Persia, and India, pos-

possessed himself of Bagdad in 1258 A. D. and put an end to the dynasty of the Abbassides, which had flourished for 500 years. The last scion of this dynasty, Muttawakil, who resided in entire insignificance as ecclesiastical chief in Cairo, was compelled to transfer his right of supremacy to Selim I after his conquest of Egypt(1517). The Sultan in Constantinople thereby became the ecclesiastical and secular chief of all adherents of Islam.

The Mongols were more capable of culture than the Turks, and they understood how to adopt the civilization of the Arabs and to cultivate the arts in their spirit. The Arab civilization then continued, although the Arab dynasties became extinct, excepting those in Spain and Egypt.

The Mameluke sultans fortunately succeeded to the control in the last century (14 th), originating from the life-guard of the caliphs, and among the Bahrite caliphs, Hassan distinguished himself by the culture of Arab art and science (1346 - 1361). Wars between Mongols and Turks filled the succeeding period.

The 9 th century of the existence of Islam saw the fall of Arab power and culture in Spain. Ferdinand took Granada in 1492, and he then commenced the expulsion and extirpation of the Mohammedans in Spain. The political power of the Arab kingdom thereby came to an end; only their religion, language and arts remained.

What the Mohammedans lost in Europe, in Spain and Sicily, the Osman sultans regained elsewhere on the Danube and the Dardanelles. Already in 1362 A.D., Adrianople was made the capital of the Osman empire, and the reign of Murad I marks a brilliant period in Turkish architecture (1360 -1389); after the taking of Constantinople (1453), we meet with a second elevated period in Turkish art in the buildings of the Architect Sinan under Soliman. (1520 - 1566). The standard of the prophet was borne even to the gates of Vienna (1683), and Egypt became a Turkish pashalik (1517). With the relief of Vienna, the star of Mohammed set in Europe, and country after country was lost.

CHRONOLOGICAL TABLE, ESPECIALLY ARCHITECTURAL.

622 A. D. July 15 - 16. Beginning of Mohammedan chronology.
629. Mecca seized; statues and idols removed from the Caaba.
630. Death of Mohammed.

634. Damascus taken; Bassora founded.

637. Jerusalem taken by Omar. Mosque of Omar founded there on site of Solomon's Temple, the richest and finest mosque in the Orient. Aleppo and Antioch taken.

638. Fostat founded; Egypt conquered.

641. Farmak, Memphis, and Alexandria taken by Amr, Omar's general.
Construction of two Nilometers at Syene and Denderah.
Restoration of the canal connecting the Nile with the Red Sea.

642. Amr-ibn-el-As builds a mosque on the site later occupied by Old Cairo, and which still bears his name; he had the mimbar placed therein.
Capital of Persia (Madain) taken; death of last king of the Sassanian dynasty.
Description of the magnificence of the Sassanian buildings.

644. Conquests in Persia, Armenia, and Mesopotamia.
Arab tribes settled in valley of the Nile.

655. Seizure of Rhodes; destruction and sale of the ruins of the Colossus there.
Establishment of a Nilometer at Ensana.

665. Seizure of Cyrenaica; destruction of ancient buildings in Cyrene. Erection of mosques and schools.

674. Introduction of an enclosed area (maksura) for the caliphs in the mosques.
Abd-el-Malek coins Arab money, while Grecian and Persian coins had been previously employed.

692. Carthage taken and destroyed.

705. Building of the Great Mosque in Damascus by Caliph Walid. First minaret in Damascus. The mosque esteemed as a world's wonder. A Greek mentioned as architect. Antique columns therein from all Syria. Ceilings of wood with gold inlaid. 600 golden lamps.

710. First expedition to Spain.

711. Second expedition to Spain; Cordova, Malaga and Toledo taken.

712. Carmona, Seville, and Merida taken.

713. Seizure of Alicante, Valencia, Saragossa, and Elvira, a Jewish city.

713. Building of a chief mosque in Saragossa.

715. Founding of the Nilometer on the island of Rodah near Cairo by the Ommyade Soliman.

717. Completion of the Great Mosque in Damascus begun (705) by the Caliph Walid; golden lamps replaced by simple ones.

Beginning of the erection of the Bridge in Cordova.

742. Building of a chief mosque and a marine arsenal in Tunis.

750. The last Ommyade, Abd-er-rahman, flees to Spain and he founds the Caliphate of Cordova.

755. Building of Bagdad.

786. Beginning of the erection of Great Mosque in Cordova on site of old Cathedral.

788. Erection of a mint in Cordova.

792. Building of Fountain Ain-Farkid in Cordova.

827. Placing the fountains and water tanks in the mosques in Cordova. Water suppied through lead pipes.

Permanent settlement of Arabs in Sicily.

837. Building of the Great Mosque in Kairwan of marble and costly terra cotta; its enclosure by a wall of polished marble ashlars in alternating black and white courses.

846. Erection of baths with marble ashlars and public fountains of the same material in Cordova.

849. Cordova in its greatest magnificence.

852. New and splendid baths in Cordova.

868 - 904. Egypt an independent sultanate. Touloun dynasty. Wealth, love of magnificence, great architectural activity.

876 - 878. Mosque of Ibn-Touloun built.

878. Syracuse taken.

919. New mosques and marble fountains in Cordova.

922. Erection of a larger mosque in Granada.

941. Building of an aqueduct on piers and arches from the mountains of Cordova to the water reservoir.

960. Improvement of the great mosques in Tarragona and Segovia. The mihrab in the latter was decorated by precious columns. Canals and water ditches in the plains of Arragon, Granada, Murcia, and Valencia.

969 - 1171. Rule of Fatimides in Egypt. Cairo founded near Fostat. Mosoue El-Asher, 971.

The entire commerce with India and the interior of Africa passes through Egypt.

981. Erection of a beautiful mosoue Sobeiha in Cordova.

The architect Fatho-ben-Ibrahim-el-omeya, famous for his knowledge and his oriental travels, builds two mosoues in Toledo.

1016. Fall of the old wooden dome (65.6 ft. diameter) of the so-called Dome of the Rock in Jerusalem. Rebuilt 1022.

1031. Division of Spain into little kingdoms with capitals in Seville, Carmona, Malaga, Algesiras, Granada, Almeria, Denia, Valencia, Saragossa, Huesca, Lerida, Toledo and Badajos.

1148. Erection of splendid palaces and mosoues in Fez.

Climax of arts and sciences, especially in Spain.

1172. Erection of a magnificent and great mosoue in Seville.

1172 - 1250. Rule of the Ayubides.

1197. Building of the Royal Palace and Tower in Morocco.

1198. Completion of a large mosoue in Seville, begun in 1195.

Mosgues and towers in Morocco.

1212. Beginning of decadence of Arab rule in Spain.

1226. Completion of Alcazar de Seid in Malaga.

1238. Mohammed-ben-Alhamar makes Granada his capital, builds splendid palaces, hospitals, schools, baths, public fountains, etc.

1240 - 1248. Sultan Saleh Ayub (Curden Mamluk).

1248. Beautifying of Granada; culture of arts and sciences there.

Building of the fortress of the Alhambra by command of Mohammed. Aoueducts and fortifications.

1250 - 1390. Bahrite Mameluke sultans in Cairo(Turkomans).

1279. Mohammed II extends the Palace of the Alhambra and its fortifications.

1306. New palaces and baths in Granada. A splendid mosoue near the Alhambra with mosaic decorations, artistically wrought columns with silver bases. A public bath built by tributes from the Jews and Christians.

1325. New mosoues, baths and fountains in Granada.

1326. Rule of the Osmans. Broussa and Nicea taken.

1333. The New and great Mosque of Yusef, an art work of the first rank.

A great palace of wonderful beauty built by Yusef in the vicinity of Malaga. Plans made according to the prógramme given by the king.

1348. The wealthy inhabitants of Granada imitate the example of Yusef and build for themselves splendid palaces.

Yusef also builds the Gate of Judgement of the Alhambra.

1346 - 1361. Culture of Arab arts and sciences by Hassan.

1355 - 1359. Erection of the finest mosque in Cairo by Hassan.

1360 - 1389. Climax of Osmanic architecture under Murad I.

1362. Further adornment of Granada and Cadiz.

1378. Mosque in Isnik. Byzantine central dome adopted in Osmanic architecture.

1375. Erection of the Palace Azake with marble fountains.

1380 - 1516. Borgilic Mameluke sultans in Cairo. Tomb-Mosque of Barkook. Mosque of Kaitbey.

1453. Constantinople conquered. Church of S. Sophia becomes a mosque and a model for the later Osmanic buildings.

1492. Christian standards wave on the towers of the Alhambra. End of Moorish and Arab rule in Spain after a duration of 800 years.

1520 - 1566. Second climax of Osmanic architecture under Sultan Soliman. The splendid buildings of the architect Sinan. The Sulemanie Mosque is his masterpiece.

1603 - 1617. Decadence under Ahmed. Mosque of Ahmed with unmistakable Indian influence.

1748 - 1755. Mosque of Nuri Osmanije is built.

1824 - 1857. Alabaster Mosque of Mohammed Ali in Cairo.

Great splendor appeared in Persia in the 9 th century under the Abassides; everything now remaining is from the era of Shah Abbas the Great in the 16 th century. Magnificent buildings in Ispahan and Teheran.

The splendid buildings in Delhi were erected between the middle of the 16 th and the middle of the 17 th centuries.

Magnificent structures of Shah Abbas the Great in Palace at Agra.

Mausoleum at Secundra.

Shah Jehan has forty mosques built in Delhi, among them the Great Mosque and the Pearl Mosque.

Mausoleum of Nur-Jehan (Taj-Mahal) termed by contemporaries the "Wonder of the World."

## Chapter 2. Characteristics of the Architecture of the Mohammedan Peoples.

"A semitic and anti-artistic, race, they subjugated countries abounding in the remains of styles in ruin, and employed the artizans of those countries in building their mosques and palaces; they at first adopted the earlier art and later grafted some of its characteristics upon a new style of their own."

Prisse d'Avennes. L'Art Arabe. p. 232-234. Paris.

2. Earliest Period.

"The Arabs formed the population of not only the peninsula named after them, but likewise of the Syrian deserts, that extended northward between Syria and the Euphrates, with further regions in the Babylonian lowlands. The western border of this desert was inhabited by Arab races, whose leadership was in the Gassanides in the 3 rd century A.D. On the eastern side in 195 A.D., there grew the kingdom of the Lachmides from the Arab settlements around the city of Hira. Its inhabitants spread along the left bank of the Euphrates and in 633 came under the rule of the southern branch of their race, when Mohammed arose and the Arabs under his successors had begun their astonishing career of victories."[4]

*Note 4. Compare Prof. G. Droysen's Allgemeiner Historischer Handatlas. Edited by R. Andree. Explanatory text, pp 80-85. Bielefeld and Leipzig. 1886.*

The people occupying the countries named, fighting under the banner of the new religion and with the purpose of never retreating, with wife, children and herds undertook a campaign of conquest through the world; they in great part consisted of tent Arabs ('abariye), who hated living in cities and villages, and but in small part of south Arabs, who liked better to dwell in houses of stone. Therefore the latter was the portion capable of civilization, and convincing evidence of their gifts and skill in building is afforded by the stone structures in southern Arabia with their long stone beams and stone roofs. Like this ancient architecture of Yemen are also the buildings in the Hauran; those stone structures consisted of coal-black, carefully wrought, and often artistically cut ashlars. Grecian-Roman art indeed cooperated with these, yet as servant and not as mistress. We find in them an architectural style of marked individuality, that is neither

marked individuality, which is neither Greek, Roman, nor Syrian, but may specially be termed "Hauranic."[5] There are likewise found the extensive cities of the Troglodytes, whose beginning goes back to the highest antiquity, and which are to be regarded as a transition from the tents of nomads to fixed dwellings.

*Note 5. Compare Wetzstein, J. G. Reisebericht über Hauran und die Trachonen, etc. Berlin. 1860.*

Christianity already ruled in those countries at an early date (180 A.D.) , and the previously mentioned "Gassanides as a nation must have been the first born son of the Christian Church," which adorned the country with numerous churches and monasteries.

The Phoenicians were allied by race and had earlier acquired fixed abodes, and they likewise possessed a developed architecture, and if the Jews called Phoenician workmen to the building of the first temple, then the half-semite only assisted semites. To declare the race as entirely lacking a gift for architecture, like Prisse d'Avennes,[6] still appears rather hazardous. The Arabs are certainly as ancient as the other peoples of semitic race; they merely retained latest their independence and freedom, and only with the acceptance of Islam, to which the Gassanides and their princes must conform, did they break with their ancient arrangements and customs.

*Note 6. In L'Art Arabe, etc. Paris. 1869 - 1877.*

Although architecture in their own countries did not attain the highest step, yet it existed there; it could not be entirely original, since Arab peoples were surrounded by highly developed civilizations on the east, west and north, and they could not avoid these influences.

Persia, the countries along the Euphrates and Tigris, Syria, the Byzantine provinces and Egypt, had long been filled with architectwral monuments of the highest rank, and could show an existence of these for already hundreds, even for thousands of years, where even cooperation in every monumental activity had been denied to the Arab races.

When they assumed the leadership in the religious movement and subjected half the world to their sway, these great political problems hindered them in the improvement and development of an individwal art. When the second caliph was asked concern-

concerning the rebuilding of the Caaba in stone after it had burned, he replied (to Ibn-Khaldun):-- "Do it, but build only three rooms and especially no high structures, adhere to the measures of the prophet,i.e., see that you retain supremacy."

Originality is not found in the buildings of the first two centuries. The adherents of Islam adapted in the conquered countries the existing structures to their purposes, or after destroying them, took the materials for new buildings and employed foreign labor for their erection. Their first architects were indeed the Cushites, or mixed Semites and Cushites from North Africa, since the great hordes of tent Arabs could supply no material in this connection.

Even for the simple construction of the Mosque of the Prophet in Medina, whose external walls were 8 ells in height and consisted of air-dried bricks without plastering, with a coat of coloring, and whose halls were covered by a roof constructed of palm branches and mortar resting on plam trunks, foreign workmen were employed.

El-Walid, son of Abd-el-Maliku sent to Byzantium for workmen for the mosques in Jerusalem and Damascus and also for two other sached places in Arabia; workers in mosaic were also called from Byzantium for these structures.

Then after the Cushites, the Rhomaers became the architects of the Arabs, and Greeks were the architects of the Mosque of Walid in Damascus, which was esteemed one of the wonders of the world (705 A.D.).

Therefore, when during a visit to Medina, Walid emphasized the difference between his mosques and that in Medina, he received the reply: "We have built mosques, and you -- churches!"

But the Byzantines were themselves again influenced by the Persians in their art style; for certain tendencies of the former, which bear more of an oriental stamp, were later adopted with special favor by the Arabs.

At the time of the rise of Arab power, existed the Sassanian empire of the Neo-Persians, though no longer politically, yet at a high elevation in relation to the arts. Byzantines and Persians were not only with sword in hand, but as a result of alternate possession of the strongly contested border lands of Armenia and Mesopotamia, they were also in sympathy

with each other in regard to the arts. The Sassanian power was broken by the peace with the emperor Heraclius (628 A.D); they could no longer resist the Arab attack a few years later.

The magnificence of the Sassanian buildings powerfully affected the conquerors, who were unable to throw off their influence later, and thus the Persians, subjugated by the war, as a third race obtained an influence upon the formation of Arab art.

In Egypt, the Arabs came into a country filled with churches and monasteries, which were transformed into mosques or served as models for them. According to Makrizi (born 1364, died 1441), there were in this country during the 9 th century A.D. 125 Coptic churches and 83 monasteries. It is therefore certain that the Copts, as history likewise states, played a part in the earliest buildings of the Mohammedans; but until a most thorough examination of the ancient Coptic monasteries in Upper Egypt is made by experts, it remains uncertain how much so, and whether the Copts participated in the artistic development of the forms of the Arab style. In the existing buildings of the Copts in Lower and Middle Egypt, which are chiefly of recent date, since the fanaticism of the Mohammedans has so frequently destroyed the structures of the Christians in the course of centuries, there appear so many forms, which are to be referred to Early Christian motives from Europe, especially from Ravenna, and to others from the interior of Asia and elsewhere, that it is impossible to decide this question without further data for the answer. Yet the forms found in Coptic buildings cannot overthrow the statement, that the specific characteristics of the Arab style must very soon be referred to Byzantine and Sassanian origins, and to these must be ascribed much of the distinction and refinement in the appearance of the buildings and of the peculiar style of their decorations.

It developed itself most beautifully and most purely in Egypt. It what manner the Arabs themselves took part in this development is hard to decide. But it cannot be contested, that they were seldom skilful artizans, and Greeks, Persians and Copts could never be dispensed with as such; but on the other hand, the skilful tendencies of certain tribes to the

domain of architecture at a very early time cannot be denied.

Likewise on Spanish and Italian soil in the solution of the architectural problems there, the cooperation of the native Christian inhabitants is not to be excluded.

According to Ibn-Khaldun, the first mention of an Arab architecture is in the decadence of the empire of the caliphs.

At about 1200 A.D., Christian buildings were still changed into mosques, as for example, the originally Frankish Church in Salchat, with its hall of knights executed in the pointed arch style, whose ashlars still bear the Frankish lilies. The great City-Mosque in Bosra was adorned by monolithic columns of white marbe and 14.1 ft. high, which were brought from the ruins of Gerasa on peculiarly constructed wagons. In a similar manner was the great Hall of Prayer in Der'at built by Saladin's deputy; the white marble quarry of antique buildings there supplied the materials for the great Mosque in Ephesus, that is now again ruined, and about 1453, the domed building of Anthemios and Isodorus (S. Sophia) in Constantinople was transformed into a mosque, besides others.

3. Earliest Architecture in the Pointed Arch Style.

Free from all imitation of older styles first appears the Mosque of Ibn-Touloun in Cairo (876-878 A.D.), which according to Makrizi certainly had a Christian as architect. It is a courtyard plan with surrounding arcades on piers, whose pointed arches in their intrados more or less closely approximate to the ogee arch. The entire design is executed in brickwork; the massy piers (Fig. 1) are rounded off in quarter columns with a plain pedestal of the smooth shaft of the column, recalling Roman forms; the capital is surrounded by lancet-shaped leaves, whose stems divide below and form surfaces of wavy outline, much changed in the course of time, that are filled by palm leaves and other surfac ornaments.

The ornamentation of the mosques consists of few motives (see Figs. 76, 77). Yet besides the form of the pointed arch introduced for the first time into architecture as an esthetic element, it is still of the highest interest for the history of art, since we probably have here to do with one of the earliest Arab monuments. In the ornamentation, we already find most motives of the Arab scrolls and interlacings. These consist of in inscription frieze carved in sycamore wood and

crowning the wall surfaces of the mosque, below it being a foliage frieze in plaster relief, whose elements are still combined in an entirely antique manner. The arches of the arcades and of the openings in the walls are enclosed by a kind of wavy scroll, where flowers and palms regularly alternate, at least on the former. We discover in them foreign ornamental elements, which perhaps indicate an Asiatic fashion, just as the minaret must have been modeled after one of those still existing in Samarra on the Tigris. In the low plaster reliefs of the building, whose ornaments were sculptured in place, we find the greater part of the forms of Arab art; beginnings of the lines cut in zigzag form are not excluded; even interlacing patterns are seen in the archivolts of the pointed arches and in the remaining railings of the outer walls of the mosque. The simultaneous date of these railings with the founding of the mosque is indeed contested by many.

Perhaps still earlier is the occurrence of the pointed arch on a small work, the Nilometer on the island of Rhodah (861AD). The existence of the line of the pointed arch as the form of an arch on buildings in the earliest period has already been mentioned in Part II, Vols. 1 and 2 of this Handbook (Architecture of the Greeks, Etruscans, and Romans), but this nowhere became an actual characteristic.

Yet not all monuments in Egypt showing the pointed arch are specifically Arab; thus for example, the beautiful pointed arched marble portal in Cairo(Nahassin quarter) shown by Prisse d'Avennes[7], was formerly on a Norman church in S. Jean d' Acre (Akkon) and was brought from there.

*Note 7. Plate 34.*

4. Other Forms of Arches.

Besides the pointed arch, the Byzantine stilted arch retained its place on openings for doorways and windows, as well as for arcades. To the previously known forms of arches of the ancient world was added as an innovation in form, the circular and pointed horseshoe arch[8], also the foiled arch in Spain especially, the trefoil arch, and the ogee arch chiefly in Persia and India (Figs. 2, 4).

*Note 8. The round horseshoe arch already occurs sometimes elsewhere on Byzantine structures of the time of Justinian ' -*

*(about 530 A.D), so that this form is not entirely peculiar to Arab art. The chancel arch of the Church in Dana (Fig. 3), as well as the arches of the blind arcades of the rock-cut Tomb in Urgub (Fig. 4) are contracted into horseshoe form. Compare Texier & Pullan. Byzantine Architecture, etc. Plates 59, 4, also pp. 248, 235. London. 1865.*

5. Arcades.

Arab art renounced the use of massive columns for supporting high portions of the structure and satisfied itself with moderately tall shafts of columns, chiefly taken from older buildings, which were then placed above each other to attain their purpose, but they did not chosse the straight architrave to span between them, like the similar arrangement in the interior of the antique temple, but they laid hold of arches, which produced a fanciful effect by their superposition and interlacing (Figs. 5, 6, 7). The sharp and rectangular angles of the piers were replaced by quarter columns (Fig. 1).

The columns dispense with uniformity and regularity, as well as the optical refinements of the antique models, such as entasis and diminution. They are generally slender and elongated in proportion to their diameters; they are usually composed of base, shaft and capital (the former being not always indicated particularly), and in arcades, they support between the impost and the abacus the stunted antique entablature block, i.e., the Byzantine impost block.

6. Ornamentation.

A further characteristic peculiarity of the style in question consists in the development and most extensive use of surface ornament, as well as of the addition of inscriptions thereto (Fig.9).

These appear not only on the internal wall surfaces of the buildings, but also on the exterior, as for example, on the surface of the dome of the Tomb of Sultan Soliman-ibn-Selim in Cairo,and others. The polychromy so peculiar to Arab art frequently plays a great part in these in its full and deep colors, with the rare use of secondary colors. New motives occur in the design of ornament, that are partly borrowed from tapestry work, and partly represent new forms, the Arab scrolls.

7. Battlements and Domes.

For the cornices of facades, the Arabs chiefly followed Egyp-

Egyptian, Assyrian, Phoenician, or even Persian models, while they chose the battlement cornice as the most effective termination.

They likewise introduced domes into their architecture after the precedents of the Byzantines and the Sassanians. Their introduction into Egypt probably occurred under Persian influences, although according to the records of Arab writers, they previously existed much earlier in Christian monuments.

Makrizi mentions in his time a church built of white stone at Assiout in Upper Egypt with 8 domes, each of which had a height of 80 ells, and that belonged to the time of Constantine the Great. Therefore it is not necessary to derive them from the Arab tent, like Coste,[11] or from the gourd or melon, like others.

*Note 9. From Texier & Pullan.*

*Note 10. From Allgemeine Bauzeitung. 1856.*

*Note 11. See Coste, P. Monuments Modernes de la Perse, etc. Plate 71. Paris. 1867.*

They rose in pointed round or bulbous form, smooth or grooved on the external surface, mostly after the Byzantine style, over a square area on arches and pendentives. The decoration of the pendentives again belongs to the peculiarities of the style. Instead of the smooth spherical surfaces of the Byzantines, adorned only by mosaics , are found the so-called stalactites, honeycomb-like forms on the spherical triangles(Figs. 9, 10, 11), which were then transferred to other structural parts.

Still the dome was never built as a colossal structure in the best period, as at S. Sophia, and it was then employed more for memorial buildings than for the mosques. Only on the tombs of elevated personages and on the mausoleums of the mosques are domes commonly found in Egypt, as at the Mosques of Sultans Hassan, Barkook, Kaitbey, El-Ghuri and others, but never for vaulting over the hall of prayer (excepting some prayer rooms of the Osmanic period). On the other hand, the liwans of many mosques are covered by spherical, groined or cloister vaults, though their forms never appear in the external architecture of these monuments, for example, the Mosques of Sultans Hassan, Barkook, etc. The dome over the

sacred rock at Jerusalem does not cover a hall of prayer. Mecca indeed possessed at an early period many minarets, but no domes; those now existing in tolerable numbers are of later date. Even the Mosques of Amrou and Ibn-Touloun originally had no domes. The small dome over the Tomb of Amrou's son is of later construction, and the domed room (evidently of much later date than the mosque itself) in the Sahn-el-Gama of Ibn-Touloun was originally a mausoleum or a medeh; the latter purpose was served by this room until a few decades since. The sole existing beam construction of the wooden dome over the mihrab of this mosque was restored some years since, and it probably owes its existence to a later restoration.

The ruins of the old Tomb before the Bab-el-Karafa in Cairo (between the Citadel and Imam), probably from the last period of the rule of the Fatimites, shows a lantern on the dome; the parallel drawn by Prisse d'Avennes from this fact between the little building and the Florentine dome of Brunelleschi is scarcely consistent with the earnestness of that investigator.

The limited use of the dome in Egypt was retained until the conquest of the country by Sultan Selim, after which the Osmanic style employed it more frequently, and S. Sophia by its structural forms furnished the model for the Egyptian mosque.

8. Minarets and Bay-Windows.

The minaret was invented without a model, at first being an elevated station for the official that called to prayer, and it is wanting on the first mosques, but formed a slender, graceful and delicately treated addition to the mosque, rising high above all the buildings of a city (Figs. 12, 13, 14).

Freely invented were likewise the attractive wooden bay windows of the private houses with their lattices (mushrabyes), that picturesquely animate the otherwise plain and unimportant street sides of the dwellings of the citizens (Fig. 15).

9. Architectural Styles.

Many designs of buildings developed gradually, and neither religion nor imitation were always the controlling forces in the different phases of development, but in a higher degree the climate, which required different arrangements in Syria, from those in Sicily and Lower Italy, or at the feet of the Pyrenees.

10. Works of the Earliest Period.

Scarcely any of the works of the earliest period of the caliphs still remain; most have merely retained the name and some materials, and but few of the old arrangements have come down to us now.

Of the old Mosque of Omar in Jerusalem (637 A-D.), of the Mosque of Amrou in Egypt (642 A.D.), of that of Walid in Damascus (705 A.D.), only the name is preserved; moreover, there falls in the first century of Islam the long series of rapid conquests, which as stated, left the people no time for the erection of its own architectural structures.

Everything further built, north and west of the ancient Arabia Felix, will be more fully treated later; the succeeding works belong to the Persian and Indian branches of the architecture of Islam. The monuments of the older period in the interior of Asia have likewise mostly disappeared during the destruction by the wars.

11. Arab-Persian Style.

The Arab-Persian style of architecture is characterized by a peculiar depressed pointed arch, that approaches the keel arch in form and is enclosed by lisenes of vertical and horizontal projecting bands, which restore the rectangular termination in the upper external ending (Figs. 16, 17).

Likewise for the enclosure, instead of the slightly projecting bands, the borders are left in the plane of the arch and are only marked in the drawing by bands of stucco ornament, or by means of polychromatic faiènce tiles.

In consequence of the lack of wood in most provinces of Persia, the ceilings of the buildings must be constructed of stone, and for this purpose was chiefly employed burned bricks, made in square form. The use of massive ashlars and of natural stone is not excluded, it was limited mostly to the substructure.[12]

*Note 12. Compare the Tailors' Bazaar in Ispahan (Chap. 5, d, page 156) with its grand and artistically executed brick vaults, also the Bridges over the Senderud, illustrated by Coste, Plates 50, 51, 52, 56..*

The domes appear in swelled, bulbous form, and they seem to have originated in a mixture of Sassanian and Byzantine elements,

unless Indian influences were most important in their treatment. The drums of the domes were there made so high as to acquire the appearance of towers.(Fig. 18).

Minarets in Persia are built in conical form, of moderate height and terminating with a canopy, beneath which is the station of the muezzin. An exception from this usual form, that recalls the chimney of a manufactory, is made by the , 68.83 ft. high, octagonal and tower-like Giznewid minaret beside the Mastsched Djuma in Saweh, with its beautiful mosaic of tiles and its bands of turquoise blue enamel with a Cufic inscription.

Recalling the grand entrance of the Mosque of Hassan in Cairo, the portals of Persian mosques are treated in the same imposing manner, as the most effective element in the subdivision of the facade.

The use of tile mosaics, common in the Assyrian and Sassanian art periods, the employment of burned enamelled tiles, and the general use of the faience invented by the Persians for covering external and internal wall surfaces, are further characteristics of the Persian style.

Among the Shiite Persians, representations of figures were also drawn into the circuit of ornamentation. Genre scenes executed in relief or painting, groups of horsemen, hunts, and single figures were everywhere employed, but they are never of high art value.(See, for example, the water bearers on the columns of the Palace of Shah-Basch in Ispahan).

12. Arab - Indian Style.

The architectural monuments of Islam in India are distinguished above all others by a certain grandeur in design; they sometimes rise from the middle of a lake or on a massive substructure, to which flights of wide steps ascend. In partial contrast to the monuments of the western empire, a symmetrical and well conceived plan makes the buildings in this country eminent. Here likewise in the early period, the existing architectural works of the Hindoo were not spared; they were either adapted to the new purpose, or materials, especially pillars, were taken from them for use elsewhere. The adoption of certain art forms from Hindoo art was just as self-evident here, as in the North and West the adoption of Byzantine and Coptic elements in the art of Islam.

Many elements from classic Grecian art are also found on Hin-

Hindoo monuments; some of these may have been brought in by the Achemenides and by Alexander the Great, just as the interior of Asia has some things in Greek art to show from the Hellenic period. Thus may be found Corinthian columns in Gandhara and in the lower Cabul valley, Doric in Cashmere, Ionic in Taxila, northward from Rawalpindi, while generally the tall pillar with bell capital surmounted by a group of animals is the local form of the isolated pillar.

Indian artizans erected the first structures of Islam, who were ignorant of stone-cutting for vaults; the surfaces of the vaults were constructed by corbelling out horizontal courses of stone, and they were closed in at top by stone slabs resting against each other.(compare Kutub Mosque and keel arches of the Mosque of Amschir).

Domes were (as on the Tomb of Theodoric in Ravenna [13]) cut from a massive block of stone and rested on walls built to enclose a square and also on triangular angle slabs, placed on the four angles of a square room.(Compare the monolithic dome of the Mosque of Amschir, 1200 - 1230 A. D. ).

*Note 13. See the preceding half volume of this Handbook.*

A few years later, we find in Delhi a kind of pointed pendentive instead of the triangular angle slabs, produced by stepped corbelling. The decoration of these by stalactites is not only original in India; but they were introduced there and are first evident in the 14 th century.

To this succeeded the era of Alah-ud-din Mohamed Shah (1296-1316), whose finest undertaking is the Gateway in the Kutub near Delhi, built of white marble ashlars, entirely covered by the most delicately sculptured ornament.(Fig. 20).

The succeeding architectural period of the Inghlak Sultans is characterized by the adoption of battering walls of unusual theckness and of the strongly pointed keel arch. During the first half of this period the filling of windows and niches by perforated marble slabs (djalis) is common, but is rarer toward its end.[15] An example from this period is given by the adjacent Tomb of Sultan Tughlak Shah near Delhi.

*Note 14. See Schlagintweit, E. Indien in Wort und Bild, etc. Leipzig. 1880 - 1881. Vol. 1. p. 72.*

*Note 15. The perforated and glazed slabs of gypsum are termed Kamariye in Egypt.*

In the year 1526 occurs the rise of the dynasty of Mogul emperors under Baber. The buildings of this monarch are distinguished by the use of tower-like perforated structures on them, sometimes as subordinate rooms and angle towers, sometimes occurring in place of battlements and in smaller dimensions crowning facades, especially in northern India.

The perfect development of the Arab-Indian style appears on the buildings of the emperor Akbar, which were erected in the vicinity of Agra, with the most important of which belongs the Mausoleum built by Jehan (Fig. 21; 1603). On a substructure 328 ft. square, the building rises in pyramidal form in 5 stories to a height of 98.4 ft., the four lower stories built of red sandstone, the uppermost being of marble. (Also compare the world famous Taj near Agra erected in white marble).

## Chapter 3. Building Materials and Methods.

### a. Building Materials.

#### 13. Natural Building Stones.

Since all countries conquered by the Arabs already stood on a high plane of civilization and could exhibit architectural monuments of all kinds, the victors did not need to seek at first for building materials; they merely used over again those employed by their predecessors without adding new materials thereto. According to the climate and to the geological nature of the country, they used natural stone and bricks in building; air-dried as well as burned and glazed bricks, porous and crystalline limestone, basalt, granite, sandstone, etc., were then found in Persia and India, Syria and Asia Minor, and in Spain and Egypt. Since the art of Islam developed into its finest and purest form in the country last mentioned, a more thorough examination must be made of the building materials used therein.

The stone quarries worked by the ancient Egyptians in the region of the cataracts and in the valley of Hamama, as well as those of the Romans in the desert between the Red Sea and the Nile, including the famous porphyry quarry in the vicinity of Gebel Duchan, were not used by the Arabs; whatever hard materials they needed were taken from ancient buildings or from some stone quarries located between Assiut and the Red Sea and still worked sometimes. Since this material must be transported on camels, it can in our time only be furnished in blocks of limited dimensions and at a very high price. Here was especially quarried the very hard limestone of ochre yellow color, like the giallo antico, containing silica and alumina, which becomes brick red when exposed to fire, and is generally employed in both tints in mosaic work. It was likewise taken for the smaller columns of the mihrabs, for example, in the Mosque of Abu=Bakr-Mashar in Cairo. Near this is found the black marble-like limestone, which is employed for portals and on the Sebils, especially those of the Turkish-Arab period. Moreover Egyptian alabaster was quarried near Assiut and in Wadi Argun southeast of Benisuef, though little used in Arab buildings, and which is little suited for structural purposes on account of its numerous cavities and holes and its brittleness. Recent experiments give a resistance of between 157 and 272 lbs. per sq. inch. But it is adapted for mosaic work, small vessels and trinkets

by its color tones and capacity to receive polish.

The ancient stone quarries in the vicinity of Cairo, those of Maksura, of Turrah, and of the Mokattam, are still worked, even if not entirely in the same manner as in the times of the Pharaohs and of the Romans, who understood how with greater care to select the thicker and more durable beds, and did not hesitate to drive galleries for several hundred yards into the interior of the mountain to reach them, while open working now usually suffices for satisfying the present need for stone.

The Arabs had no thorough knowledge of the differing resistances of materials' for we usually find light masses supported by columns of enormous thickness, while in other places thin and tall columns are loaded with great burdens. Still the greater resisting capacity of granite and porphyry was not unknown to them; since these were employed at the intersections of arches in the angles of the courts of mosques, and also where domical structures were to be supported, granite columns were used, for example, in the Mosque of Merdani and in the Mausoleum of Kala'un, both in Cairo.

The stone quarries mentioned in the vicinity of Cairo belong to the earlier tertiary (eocene) formation and now chiefly include the nummulite bearing beds thereof (nummulite-limestone), represented by a snow-white or earthy-white, chalky, or so=called soft limestone. Above the nummulite courses lie the latest eocene beds, that contain a lime-sand-stone rich in silica, interrupted by various layers of hard shell conglomerates and looser marl.

The red silicious sandstone of Gebel-el-Achmar (Red Mountain), which is of still later date than the beds just mentioned, is now principally employed for mill-stones, but it is also found on the monuments of the Arab period.

From the uppermost eocene beds are taken the best and most durable building stones (because rich in silica and free from salt; resistance 200 to 258 lbs. per sq. inch; weight 125 to 156 lbs. per cubic ft.). The facades of most earlier monuments are covered with this, while from about the 15 th century, courses of this kind of stone alternate with others from the lower and lighter nummulite beds.

The courses of ashlars are up to 1.64 ft. high, thus on the Mosque of Ibn-Kalaun in the Citadel, whose ashlars belong to

the nummulite beds. The mausoleum of Barkook has blocks 4.92 ft. long, 1.48 ft. high, and 1.31 to 1.41 ft. deep. On the other hand, many buildings are merely faced with courses without headers, only 0.33 to 0.66 ft. deep and 0.98 to 1.25 ft. high, from which results the bulging and loosening of the courses of solid masonry, caused by the disintegration of the gypsum mortar by dampness ascending from the ground into the base of the buildings.

The soft and porous chalky limestone used for floor slabs (weight about 119 lbs. per cubic ft. and resistance of 129 lbs. per sq. inch) absorbs up to 20 per cent of its volume of water. Directly after the blocks are quarried, they are sawn into slabs 0.8 to 2.0 inches thick, which in the better houses are coated with a hot extract of linseed after setting.

14. Employment of Ancient Ashlars.

The exploitation of antique monuments by the Arab architects for obtaining costly materials has already been mentioned. From them came the fine granite, syenite, porphyritic stone, diorite, and porphyry, so frequently occurring in Egyptian mosques, as well as a green serpentine-like breccia, which we mention especially on account of its peculiar beauty and the rare Italian breccia-marble, and also the light gray Grecian marble in larger blocks.

The use of columns from ancient buildings was very varied. They were generally used again as columns; but they were worked over into door jambs, architraves and lintels, or were sawn lengthwise into slabs for covering walls, cenotaphs, and the entrances to sepulchres in the mausoleums. Sawn transversely, they form the circular slabs in the centres of the marble mosaics of floors. Capitals or bases of columns were hollowed out and used for enclosing the openings of the fountains in the sebils, the column material further supplied mortars, bases for water vases, slabs for inscriptions, etc.

15. Burning of Lime.

The burning of lime in Egypt, before the European method was introduced, in cylindrical kilns of about 10 ft. diameter and an equal height, built of quarried stones and Nile mud for mortar. The fuel was the same as now, straw, reeds, rushes and plants of the most diverse kinds; burning continued for two days and one night.

16. **Mortar.**

The mortar employed in the erection of the monuments in Egypt, and which is also still used, has the following composition; 2 to 3 parts of slaked lime and 3 parts of Nile mud, whose chemical analysis is subjoined:--

| | |
|---|---|
| Water | 4.86 per cent. |
| Organic material | 10.14 |
| Carbonic acid | 1.00 |
| Iron oxide | 8.24 |
| Clay | 6.75 |
| Calcareous earth | 3.47 |
| Magnesia | 1.84 |
| Phosphoric acid | 0.24 |
| Sulphuric acid | traces. |
| Silicious acid -clay earth | 62.97 |
| (Containing 67 % silicious acid and 33 % clay earth). | |
| Total | 99.53 |
| Nitrogen | 0.163 |

This mortar was chiefly employed for foundations, but also for exposed masonry, yet never became as hard in the latter as in the foundations, which always retained a certain degree of dampness. In exposed masonry, it in time fell into dust. A larger quantity of salt was usually added to the mortar for flues and like kilns.

A kind of mortar used for structures in water consisted of two parts brickdust (humera) and one part lime, or two parts humera, one part earth, and two parts lime. The common mortar for buildings was composed of one part ashes, one part Nile mud, and one part lime.

The ashes (kussermill or ussermill) was preferably taken from baths and bake-ovens; that from baths, which were heated with street sweepings, produced the best and most rapidly hardening mortar, suitable for foundations and for the walls of reservoirs for water.

The mortar for terraces consists of one part gypsum, one part ussermill, and one part lime, and it is very durable for that purpose, althiugh varied in composition, since rains seldom last long.

The Arabs in Spain made much use in their buildings of a kind of concrete, a mixture of lime, sand, clay and small sto-

stones, which acquired the hardness of natural stone in a short time.

In general, we observe in the so-called Mohammedan peoples a preference for the use of earth mortar in their buildings, both on account of the easy obtaining of masses of earth in the extensive alluvial countries, but also and chiefly, because every vestige of dampness was removed from the sand mortar by the hot and at times almost perfectly dry air, even before a chemical combination occurred.

17. Bricks.

The dwellings of the fellahs and the agricultural buildings in Egypt were constructed of sun-dried bricks, as they still are. Clay and earth found an extensive use in all parts of the houses of the Mohammedans, with burned bricks for the hypocausts of baths, floors of rooms, coverings of walls, and vessels of all kinds, made without glazing.

In these industries, the country of the Euphrates and Persia made themselves especially prominent. This was in some provinces caused by the lack of natural stone, or the difficulty of working and transporting it, as well as by the existence of excellent clays and earths.

18. Gypsum.

Gypsum plays an important part as a building material in all countries of Islam. In Egypt, it in crystalline form permeates in all directions as veins and bands, the clays of the tertiary formation, increasing to masses in certain places. It is exposed to view in many places in the desert and covers the ground with its glittering crystals, but it is there seldom pure, being frequently mixed with clay and being of a grayish color.

From the fine crystalline sorts are made relief works of all kinds; from the commoner kinds are cast the perforated vaults for baths and privies, and also the mortar is made for all other vaults, the mortar for setting steps and ashlars, for setting floor slabs, etc. The last sort of mortar is also used for stucco-work and plastering, adding to it thin lime paste when used; in finer work, the plaster surface then receives a thin coat of white or marble lime. In some old mosques are found as many as 15 such thin coats of plaster, since it was a custom to give the interior of the house of prayer a new,

festal coating, on the occasion of a change of ruler or other extraordinary occurrence.

19. Wood.

Spain, European Turkey, Asia Minor, and India were rich in building woods, while Syria and Arabia were poor in them. The costly teakwood, the trunks of the date palm, the otherwise slightly esteemed poplar and elderwood, and the different leaf=woods and coniferae still growing in the South, were employed as structural woods, according to their existence.

In Egypt during the earliest period of the empire of the Caliphs, the stems of the date and dom palms exclusively served, and they were split for smaller structures, but in the mosques were used as round trunks, partly covered by boards of sycamore. The country was poor in kinds of woods, having only the sycamore (a kind of fig), the Nile acacia, two species of tamarisk, the nabk-tree, the melia, the orange and the citron trees, which had to satisfy the needs of architectural, hydraulic, and ship construction. Besides these and for finer work were used the sandalwood, walnut, beech and ebony, the cordia, the apricot and the peach trees. The very durable pine of Asia Minor, the larch and the elm, were only first introduced under Turkish rule. Only very recently has the lebek-acacia been used.

20. Glass and Rock Crystal.

The glass industry must have been naturalized among the Arabs at an already early date, the principal glass manufactories of the East were indeed in Syria, Bagdad, and Irak. From the latter must have come the enamelled mosque lamps, of which an only approximately correct example of the 14 th century is given in a colored plate by Prisse d'Avennes (Plate 17). The shape of the lamp in these is not executed with particular care and clearness, the glass is greenish and impure in color generally, and also the drawing of the enamel ornaments is not especially true, yet the whole makes a good impression in its main outlines, in the harmony of color of the enamel, in the alternation of arabesques and inscriptions, and in the richness of the gilding. The production of such lamps indeed ceased long since, and besides the relatively rich collection of the Arab Museum at Cairo, there are only single examples in the possession of private persons or in European museums.

These lamps of enamelled glass were rather ornamental, than

actual lamps for lighting; for the single oil lamps (sergah), suspended inside by three little chains, could at most make apparent the outlines of the ornament and the colors of the enamels. The actual lighting of the interior was done by hundreds of lamps, similar to our old night-lights, which were grouped around the former and were suspended by long wire chains from the ceiling and the tie-beams of the arcades.

Whether these lamps were likewise made in Cairo is strongly doubted; but it seems certain that in the later period the Venetians supplied them. Fragments of such enameled glass vessels were indeed dug up in the old rubbish heaps, especially in those of Fostat, and Arab writers speak of extensive bazaars for glass wares. Still the ruins of large glass-works were nowhere found; but primitive works existed until the last decades, mostly managed by Syrians, who chiefly made ordinary medicine bottles, lamps for mosques, etc., as well as bracelets from the fragments of glass vessels imported from Europe. Small weights of pressed glass, earlier regarded as coins from their similarity to them, already occurred in Egypt during the 1 st century after the Hegira, and probably at the same time brightly colored glass beads, which are found in considerable numbers in the rubbish in the suburbs of Cairo.

Articles were also made of rock crystal. Arab writers mention a polished glass cup, that the first Omayade gave to a Greek patrician.[17]. In the 2 nd century, glass enamels were made, with beads of the same. Costly wine cups were made of rock crystal and decorated by gold inlays. Thus according to Makrizi, a crystal cup from the treasury of the Fatimides was sold for about 360 dinars ($720). Crystal vessels were variously treated, partly engraved, partly having colored glass reliefs, and they were in the form of pitchers, vases, cups, bowls, flasks, etc. Drawn glass was likewise produced.

*Note 17. See Kremer, A. Culturgeschichte des Orients unter den Khalifen. Vienna. 1875 - 1877. Vol. 2. p. 281.*

Bright disks of special color effects were frequently employed in small and thin pieces in the slabs filling windows, which were cut from gypsum and limestone. These are frequently still preserved in old mosques and houses.[18]

*Note 18. In De Vogue's Temple de Jerusalem, etc., (Paris, 1865) Plates 24, 25, 26 are colored representations of the*

*windows of the Mosque of Omar in Jerusalem, which belong to the 16 th century. According to Socin (p. 178), their splendor of coloring is astonishing. They are composed of merely monochromatic pieces of glass, not set in lead, but in plaster and held by iron clamps. They are externally protected from the rain by a faience grille. They bear the name of Soliman and the date of 1528.*

Colored cast glass was likewise made and employed as a part of fine mosaics and as little columns in the dwarf arcades of the decoration of the mihrab.

21. Tile Mosaics and Faience.

Ancient Persian and Assyrian buildings furnished the models for a branch of art and industry, which was to rise to a high elevation under the influence of Arab art in the Asiatic countries of Islam. This comprises tile-mosaics and faience, which from here extended along the North coast of Africa to Morocco and further to Spain, Sicily and Italy (Azulejos, Majolicas).

Thus are found in the Nile delta buildings with simple tile mosaics composed of red, yellow, and black tiles, often finely cut or polished and set with white mortar joints.

On the North coast of Africa, especially in Morocco and Tunis, there is still in use a mosaic industry employing their monochromatic enameled faience tiles cut by hand, both for florrs and set in lime mortar, as well as for wall decoration, then being set in gypsum; the rapidity and skill of the workmen accustomed thereto is wonderful, as they cut the most difficult geometrical figures free hand from faience tiles about 4 inches square, with a little sharp hatchet. With great dexterity and certainty, and almost without a preliminary drawing, they set in fresh mortar the elements of the ornament, which are assorted in a box near them.

In the earliest period and even in the buildings of the Ghaznevides, these mosaic decorations appear to have been executed in bricks of different colors. Thus, for example, no enamel is found in the brick mosaics of the ancient addition to the Mausoleum Imamzadek Fajia near Veramin. But under the Seldjuk dynasty already occurs some ornamentation on turquoise-blue faience, applied directly on the faces of the bricks. One of the finest examples of faience decoration is on the octagonal

tower in the ruins of the Mastsched Djuma at Narschiwan from the time of the Mogul empire (14 th century): with the red masonry effectively alternate bands of turquoise blue enamel laid on bricks and slabs with great Cufic inscriptions on a ground of blue enamel.

About the middle of the 14 th century, the faience became richer in drawing and in colors. The letters were later skilfully cut on square bricks, only the former (letters) being enameled. It was thereby intended to replace or even imitate true mosaic. This art took on a new flight with the building of the Blue Mosque in Tabriz under Dschechan Shah, a Mogul sultan of the dynasty of the black ram in the 15 th century, which art by a certain luxuriance in the invention and drawing of novel geometrical figures led to a degeneration. This was then followed by the omission of straight lines and the introduction of conventionalized plant forms, which were still represented in mosaic.

Under Shah Tamasp, bricks without enamel were still used merely to enclose the panels, an arrangement that had as a result a great increase in the cost of buildings.

22. Faience Tiles.

A cheaper method was then adopted by replacing the enamel mosaics, earlier executed by setting lines and cubes of bright colors beside each other, by enameled tiles painted with the brush.

In the famous faiences of Tabriz are employed light and dark blue, white, black, brown, and green colors.

Under Shah Abbas (1557 - 1628) the use of faience, unknown till the middle of the 14 th century, became more common, and to the colors just mentioned were added others, partly at the expense of harmonious agreement. There are those great panels with rose colored and red flowers on a white ground, pictures of combats, in which the inevitable devil Rustem and demons are pierced.

A special kind of these enameled tiles are those with metallic lustre, which we find in such a remarkable way in the newer parts of the Tomb Imamzadeh Fajia and likewise in Spain, and these shine with light yellow, brass-colored and copper-red lustre with a uniformly clear metallic reflection from the surfaces.

We further mention here the Persian faience with representations of figures in relief.

The use of faience tiles was later so common in Persia, that not only were the mosques covered with them, but some private houses were likewise entirely coated with them, in the interiors and on the facades.

These modes of decoration passed from Persia into Asia Minor and European Turkey, where they are still greatly liked.

Very remarkable are the masterly faiences of Broussa (Asia Minor). In the Jeschil mosque there, built by Mohammed I (1420 A.D)., the faience work is executed in an unsurpassable manner' especially in the kiblahs and in the inscription frieze of the walls is it distinguished for the treatment in relief on certain members, as well as for the depth and splendor of the tones of the ornaments.

Not less do the faiences of the Turbe of Prince Mustapha, the youngest son of Sultan Mohammed II (died 1472), arouse the astonishment of the visitors. Yet these objects of art industry do not come from Mohammedans but from Genoese, who successfully carried on this art after Persian models in the neighboring Isnik, the ancient Nicea, in the 13 th and 14 th centuries A.D.

The Alhambra likewise shows among its original mosaics of the lower walls typical carved bands of inscriptions and also pressed tiles in the pavements; the greater part of those now existing nevertheless belong to modern restorations and are far inferior to the old in execution.

23. Marble Mosaic.

While in most countries of Islam, faience and faience mosaics were chiefly employed, marble mosaics were more used for floors as well as for covering the walls of Arab monuments. Thus the parts of the floors in the better mosques, which were not covered by mats or rugs, show marble mosaics in delicate and variegated interlacing patterns, that are grouped aroung smaller or larger circular marble slabs; but the lower wall of the hall of prayer was decorated by larger slabs of precious kinds of marble, alternating with those of porphyry, granite, etc. These round and oblong slabs were obtained from transverse and longitudinal sections of antique columns. In the state apartments of secular buildings is more commonly found the execution of the floors in small pieces of marble than that of the wainscoting

We further mention here the Persian faience with representations of figures in relief.

The use of faience tiles was later so common in Persia, that not only were the mosques covered with them, but some private houses were likewise entirely coated with them, in the interiors and on the facades.

These modes of decoration passed from Persia into Asia Minor and European Turkey, where they are still greatly liked.

Very remarkable are the masterly faiences of Broussa (Asia Minor). In the Jeschil mosque there, built by Mohammed I (1420 A.D)., the faience work is executed in an unsurpassable manner' especially in the kiblahs and in the inscription frieze of the walls is it distinguished for the treatment in relief on certain members, as well as for the depth and splendor of the tones of the ornaments.

Not less do the faiences of the Turbe of Prince Mustapha, the youngest son of Sultan Mohammed II (died 1472), arouse the astonishment of the visitors. Yet these objects of art industry do not come from Mohammedans but from Genoese, who successfully carried on this art after Persian models in the neighboring Isnik, the ancient Nicea, in the 13 th and 14 th centuries A.D.

The Alhambra likewise shows among its original mosaics of the lower walls typical carved bands of inscriptions and also pressed tiles in the pavements; the greater part of those now existing nevertheless belong to modern restorations and are far inferior to the old in execution.

23. Marble Mosaic.

While in most countries of Islam, faience and faience mosaics were chiefly employed, marble mosaics were more used for floors as well as for covering the walls of Arab monuments. Thus the parts of the floors in the better mosques, which were not covered by mats or rugs, show marble mosaics in delicate and variegated interlacing patterns, that are grouped aroung smaller or larger circular marble slabs; but the lower wall of the hall of prayer was decorated by larger slabs of precious kinds of marble, alternating with those of porphyry, granite, etc. These round and oblong slabs were obtained from transverse and longitudinal sections of antique columns. In the state apartments of secular buildings is more commonly found the execution of the floors in small pieces of marble than that of the wainscoting

in slabs, and among these are frequently the finest examples; Arab mosaic patterns with complicated intersections. Faience tiles sometimes appear in these mosaics, but only when the required tint was not to be obtained in stone.

24. Other Mosaics.

Mosaics employing the ceramic works mentioned, as well as marble, granite, porphyry, basalt, etc., cast glass and semi=precious stones, occur on the concave surfaces of the mihrab. Mother-of-pearl is also frequently wrought in with them, that then lends to the mosaic a shining silvery lustre. In the domical surfaces of the mihrab, Byzantine golden mosaic generally found its application.[19.]

*Note 19. De Vogue (Plate 21) published the beautiful mosaics of the Mosque of Omar in Jerusalem, which with few exceptions belong to the first builder and are distinguished for their fanciful invention and delicacy of execution and are likewise of the greatest importance to the history of art. Above them extends a broad blue band, on which run very ancient Cufic inscriptiins in gold letters. One Cufic inscription states: --"This dome was built by Abdallah el Imam el Mamun, the Prince of the Faithful in the year 72? El Mamun is to be replaced by the original El Malik. (Also compare Socin, p. 172, 177).*

25. Wood Mosaic.

An important part was played in Arab art by mosaics in wood, in which, besides costly woods like sandalwood, rosewood, ebony, citron, etc., there were also used ivory, the latter frequently dyed, mother-of-pearl, tortoise-shell, and tin, and some portions of the ornament were gilded. With this ornamentation were especially covered the wainscotings in the interiors of the mosques and private houses, even the ceilings, the grilles of the maksura and mimbar, the kursi, the chests for the Koran, etc. Marquetry-work, still common in India, was especially found on the chests for the Koran.

26. Leather.

Reference may likewise be made to the employment of leather for hangings, as on the painted ceilings of the Alhambra, as a covering for the chests for the Koran, as a material for binding Arab books, in which the Mohammedans have done so much, and also as a substitute for parchment or paper.

27. **Metals.**

As for the use of iron, the very dry and preservative climate of most countries of the people of Islam on the whole permitted the use of wood instead of iron in cases, that would not be considered in the North. Hence the general use of turned wooden lattices for window shutters of massively constructed buildings, the employment of artistically arranged wooden bolts for fastening doors, the use of wooden locks, and the anchors for masonry and arcades, as well as the substitution of wooden dovetail cramps for metal cramps for ashlars.

The covering of house doors by broad iron bands or by nails with ornamental heads is worthy of mention. The branches of candelabra, the chains for suspending them, as well as nails, rings, weapons and tools, concerning which we cannot enter into greater detail here, were likewise made of iron.

28. Brass and Bronze.

Brass and bronze played a greater part in Arab art. We usually find important grilles made of these metals, thus around the cenotaphs of the mausoleums, in their window openings, and on sebils, besides chased plates or cast pieces or ornaments on wooden doors, rings as mouldings of marble columns, etc. To this was added the manufacture of vessels of many kinds, wire chains and wire lattices of the same metals. The kursi and the lamps were generally made of perforated plates or of thin cast plates, as well as the round plates (sannije) around which, placed as a platter on the kursi, the family or a society grouped itself for meals. Chasing and inlaying were common in the ornamentation of these articles.

29. Copper.

Copper was frequently employed in hammered work for crescents on domes and minarets, for charcoal pans (mangal), cooking utensils, in arrangements for baths and for water pipes.

30. Silver.

Silver was used to a small extent for fastenings of the grilles of tombs and as overlays on trinkets and vessels. Several examples remain of broad rings in hammered silver plate with enchased quotations from the Koran; of the palm trunks overlaid with silver plates in the gardens of the emirs, mentioned by Arab writers, scarcely any vestiges may be found. These

have disappeared like the golden lamps of the Mosque of Walid in Damascus and the massive golden ashlars of the golden doorway of the Palace of the Fatimides in Cairo.

31. Gold.

Gold was more seldom employed as a solid metal for vessels, but more as overlays, especially for weapons and vessels, as well as on the bronze coverings of doors (for example, the door of the Mausoleum of Sultan Hassan in Cairo); on the contrary, it found wide use as gold leaf in the rich decorations of the splendor-loving orientals.

Lead played a great part in the setting of columns, to compensate for the unevenness of the surfaces between shaft and capital, for the intervals were filled with melted lead, often so carelessly that wide and irregular lead rings are frequently to be seen at the joints, from which the wooden wedges sometimes still project, which were used in setting the stone. This metal was likewise employed for covering roofs and domes, for baths and water pipes.(Compare the lead covering of the wooden dome of the Mosque of Omar in Jerusalem.).

b. Building Methods.

32. Stone Buildings before Mohammed.

"On the walls of antiquity, either with antique materials or with their own poor ashlers, the Mohammedan Arabs built their city walls, towers and fortresses." Small, irregular and poorly joined are the building stones of the Mosque of Omar in Jerusalem.

They thought to enhance the solidity of the enclosing walls by building in the fragments of columns: hence we find their systematic use, particularly in Syria and in the countries on the Euphrates. These were also artificially imitated on the ashlers, and the crusaders borrowed this idea from the Arabs.

The country first conquered, Syria, is not rich in original Arab structures, since the victors found too many antique buildings there, which they directly employed and arranged for their own purposes. Stone construction in its extreme results illustrates, as before stated, in Central Syria, the Hauran and in Yemen, the buildings of the period of Arab art preceding Mohammed. The coursing of great dressed ashlars without mortar recalls the methods of stone construction usual among ancient civilized peoples.

33. Arab Architectural Construction.

The Mohammedan sons of the desert (mostly tent-Arabs as already stated) had no time during the extension of their sway, which lay nearest their hearts, to examine the ancient works of allied races and to transfer their peculiarities; wherever they came, they satisfied themselves at first with the existing mode of building, whose inventors and masters were transferred to them in science and skill. Therefore there is no peculiar method "of building in the Arab way", no specific Arab architectural system.

The rulers of the faithful took the native people for their buildings, wherever these were, even if they belonged to another faith. Master and workmen were sometimes Greeks, sometimes Copts, sometimes native, and sometimes foreign Mohammedans.

34. Building Construction.

The Arab architects drew no working plans in the modern sense. The builder brought the architect and visited the locality with him, and he decided on the architectural arrangement and the subdivision directly on the site. The work next succeeding, such as the excavations, construction of foundations and of the visible walls, the ceilings and roofs, was not carried on uniformly over the entire building, but the structure was divided into parts, which were successively completed, the finished portion being occupied without awaiting the completion of the whole. This system of erection evidently often required many changes, and it also explains many irregularities in the plans. (Deflections of axes, non-intersections of walls, unequal angles, etc.). (Compare Abd-el-Latif in Prisse d'Avennes, p.168). The course of the outer and division walls were then bestrewn with lime, gypsum, or (like the treasurer of Mohammed Ali) with meal in accordance with the wish and command of the builder, and the work of excavation and foundation immediately proceeded according to these.

35. Foundations.

In soft soils, the Arab architects resorted to foundations on sunken wells, a method either invented by themselves or introduced from India, by building wells of bricks in lime mortar on cassions of sycamore wood 1.3 ft. (2/3 ell) wide and 3.87 ft. (2 ells) in clear diameter, 5.82 to 7.76 ft. (3 to 4 ells) high, sinking these at distances of 7.76 ft. apart.

*Note 20. Prisse d'Avennes. p. 168.*

*Note 21. The Arab. ell (diri beledi) equalled 2 Roman feet; Mahmud Pasha Felekt determined the average length of the Roman foot at 11 %inches, so that one ell (% 24 kerat) % 28½ ins.*

For foundations of minarets and quays, piles were likewise driven in Egypt between the wells filled with concrete.

36. Walls of Natural Stone.

The thicker walls consist of a core of masonry of spalls faced on one or both sides with dressed stones, in which the mortar is employed in a very thick state and forms about one-third part of the entire masonry. The mortar layers at the bed and joints are rubbed smooth on the surfaces of the wall with the trowel. The separation of the stone facing from the masonry core in walls of no great thickness is the natural result of this system, and it is frequently noticed on the tombs near Cairo.

A characteristic Arab bond is nowhere found. The most common is that with headers and stretchers in the same course or the before mentioned emplecton of the ancients, in which the mortar of earth and gypsum is used as a binding material.

37. Wall Anchors.

It was sought to give to the mortar greater strength by building in ties of wood, a method already recommended by Vitruvius[22] and also extensively employed by the Byzantines[24]. Philo of Byzantium (2 nd century B.C.) earlier required the building of oaken beams lengthwise into fortification walls at distances of 6.06 ft. apart in height.

In the 6 th century A.D., Procopius mentions the existence of wooden ties in the walls of Persian military structures.

In Byzantine walls, these generally lie lengthwise and crosswise, thus forming a complete lattice-work.

Iron anchors were employed by the Byzantines only in walls of coursed stones. After Byzantine traditions, the monks on Mt. Athos still lay on the beds of ashlars pieces of hoop iron, bent up at their ends. The subjoined examples of wall anchors (Fig. 25) show how far the Arabs followed their Byzantine instructors; like them, they also used iron; yet this was not commonly usual.

For joining the stones of ashlar masonry, the dovetail, common in the entire earth from ancient times, was also used, as

shown by the dovetails of hard wood of the subjoined form (Fig. 24) and magnitude, found in the ashlars of the minaret and in the domes during the latest restoration of the Mosque of Barkook.

Instead of these, there were constructed entire anchor courses of stones, that formed an immovable intermediate course by the mode of cutting the joints.

38. Brick Masonry.

Brick masonry was chiefly employed on the earliest Arab monumental structures in Egypt, for example on the Mosques of Amr and of Tulun in Cairo, but it likewise presents no peculiarities in construction, and in comparison with the later masonry, it is only remarkable for the relatively more careful construction of the wall surfaces of arches and niches.

Fig. 25 gives a representation of the working tools common for thousands of years until now and unchanged.

39. Isolated Supports.

Piers and columns were either built of courses of separate ashlars or were monoliths; there remains nothing more of the antique care for jointing and setting.

As already mentioned in the enumeration of building materials, the shafts are mostly carelessly set on wooden wedges with leaded joints.

The Byzantines employed as frequently as possible monolithic shafts of columns of good limestone set on edge; but they often took them from antique structures (a good example for Arab pupils), and in order to protect them from the harm of overloading by their vaults, i.e., against flushing, they enclosed them at top and bottom ends with metal hoops, which were ornamentally treated. (Compare S. Sophia and the Church of Vatopedi on Mt. Athos).

They also frequently renounced entire shafts and divided the shaft into 2 or 3 drums set on edge, between which they always inserted drums set on the natural bed (compare the Cistern of 1000 columns in Constantinople)[24]; any split drums would be firmly held by the inserted drums.

*Note 24. See Choisy, A. L'Art de Batir chez les Byzantines. p. 116, 117. Paris. 1883.*

In order to produce a uniform distribution of the load over the dressed surfaces, the Byzantines set their heavily loaded columns on sheets of lead of about 1/25 inch thickness.

The use of lead and of mortar in ashlar construction is to be placed in the later imperial period. Only the small bearing surfaces of the drums of columns received lead plates, while they were satisfied by placing the larger surfaces between capital and impost on a layer of mortar. The danger from the sheet lead consists in its squeezing out under a very much heavier loading of the column. To prevent this, in the East iron bands are still placed around the joints in setting columns, whereby the yielding of the lead is avoided.[25] As the instructors once did, so do the pupils now proceed.

*Note 25. Compare Choisy. p. 15 - 17.*

40. Arched Construction.

Like the walls, the arches were built both of natural stone as well as of bricks. The buildings of the Arabs (Hauran) of the time of the acceptance of Islam show in arched construction the undeniable tendency toward the labored, since the preference was given to complicated jointings in preference to the simple and natural. A more complicated stone-cutting cannot easily be found than that of many ashlar arches of the Hauran, that date from the first era of the Christian chronology. The remark by Prisse d'Avennes (p. 171); "stone-cutting long remained in its infancy among the Arabs", is not true for early Arab structures.

The Byzantines likewise did not drop these subtleties in stone-cutting, which were also retained by Roman architects of the time of Diocletian in Dalmatia (Spalato), indeed under Grecian influence, and that we meet again on the Tomb of Theodoric in Ravenna.

For very small spans, that could have been better covered by a straight lintel, and could have been so, as usually shown by the dimensions of adjacent stones, resort was had to the platband arch of very small ashlars, the contact surfaces having worthless and affected projections and recesses, hard to cut and fitted with difficulty, and an imagined connection of the voussoirs together without the aid of any other materials was intended. But these affectedly constructed lintels were loaded in very few cases; we everywhere find a depressed discharging arch built above them (Fig. 26). But in many cases, this artificial construction is only an apparent one; it merely exists as a mosaic in the drawing and is cut out of thin slabs,

either set before or above a simple core construction of the ordinary kind with smooth adjacent surfaces.

The depressed arches were sometimes constructed in the ordinary simple manner of voussoir stones with smooth contact surfaces, sometimes with the complicated stepped or wavy cut joints (Fig. 26). The very affectedly wrought jointings are almost always merely facings.

Round and horseshoe arches, foiled and trefoil arches, usually show the plain radial jointing in ashlar work, while the older structures in the Hauran exhibit the most complicated arrangements. In the city of Sammet-el-Berdan, Wetstein (p. 56) found depressed arches of 32.8 ft. span, made of coal black ashlars of the country stone with the jointing shown in Fig. 24 c.

In using small materials or bricks, the method of construction was employed, that we have learned to recognize in the late Roman period; the Roman arch courses on intrados and extrados were likewise retained among the Arabs of the first period, as shown by the arches of the Mosque of Amr in Cairo. (Fig. 27). Pointed gable arches and heads of niches were constructed of two straight arches abutting against each other. (Fig. 27).

Simple jointing was also preferred for the pointed arch. Prisse d'Avennes (p. 173) gives as a characteristic difference in the construction with ashlars, that the eastern pointed arch in opposition to the western has a keystone common to both sides of the arch.(Fig. 28). This may be true in the valley of the Nile; but the principle must not be extended over the entire East; for the beautiful pointed arches of the Mosque in Ephesus, wrought from white marble (see Fig. 35), do not have the common keystone. It is likewise wanting in the keel arch. (Fig. 29). Therefore the conclusions of Prisse d'Avennes concerning the relations of the eastern and western pointed arches fail.[29]

*Note 29. Moreover there are also western pointed arches with keystones.*

41. Wooden Ceilings.

The simplest wooden ceilings were originally constructed in Arabia and in Egypt of entire or split date palm trunks and their leaf stems, over which a layer of loam was spread.(Fig.30).

Since with the exception of the dom palm, the palm trunks did not admit of being finely dressed, on account of their coarse structure, then to produce an arganic change from the cylindrical surfaces of the palm trunks to the horizontal surfaces of the ceiling and the vertical ones of the walls, these must at least be partly covered by boards. In the latter case, the rectangular portion A (Fig. 31) and the upper part B of the beam were made to conceal the hollow spaces, while the transition from the rectangular section to the round one (C) was eased off, while the suffface of the beam became again visible at C.

In richer ceilings, both the beams and the intervals between them were covered by wainscoting, adorned by painting, carving and gilding.

This method of construction was that most common for the ceilings of the mosques and the state apartments of Arab palaces. Thus, for example, in the House of the Gamal-ed-Din-es-Zahab in Cairo, two plans of which are given under d (Figs. 208, 209), the Ka'ah or the pricipal apartment is a hall very long in proportion to its width and is domed in its middle portion (denoted by H in the plan of the upper story), while the Liwans (b and c) on the right and left of it show the ceiling construction here described. Between the latter and the much higher domical construction are placed massive wooden consoles, which end below in stalactites.(See the section through the Ka'ab in Fig. 207).

Later, when through their relations with the Osmans, the well forested provinces of Turkey supplied larger timbers for greater widths of halls, the date plam trunks and the casing of boards were abandoned, but the old form of plam trunk construction was retained, being carved on the timbers employed.[30]

*Note 30. See Bourgoin. p. 67.*

Bourgoin gives in the work mentioned below[31] the plan of a ceiling of the time of Kaitbey and details thereof.

*Note 31. Precis de l'Art Arab, etc. III. Plate 65. Paris. 1889.*

The 11 supporting beams were enclosed on the walls by a massive cavetto, whose monotony was broken by angle pieces in Stalactites ending below in an Arab lily (1) and by stalactite corbels (2 and 6): an inscription frieze covers the interspaces of

the cavetto between these stalactite motives.[32]

No. 3 (Fig. 32 ) represents a modification of the stalactite corbel in the cavetto from the sebil of the Tomb-Mosque El-Gyseh near Cairo.

*Note 32. Facsimile reproduction therefrom.*

These beam ceilings are allied to the coffer ceilings common in the entire ancient world.

The Mosque of Nafr-ibn-Kalauns in the citadel at Cairo exhibits much a ceiling in hexagonal form with a beautiful organic transition of its angles into the ornamentation of the niches of the stalactite cornice.

To a later period belongs the ceiling covered with boards, some panels of which were distinguished by low domes.

Beautiful examples of the this system of construction are found in the palatial private houses of the Osmanic period at Cairo. Stalactites nailed on the surface of the ceiling, ornaments of stucco, interrupted rounds and perforated boards, supply the elements of the docoration.

Such works make an attractive general impression with their richly decorated bands and with their stalactite domes (Fig. 33) in the raised parts of the ka'ab; but unfortunately, a close examination here recalls the period of the decadence of Arab art.

The ruins of the Musaferchane in the Gamalije quarter at Cairo may serve as an example.

42. Stone Beam Ceilings.

Stone beam ceilings remain a characteristic of the Hauran, poor in woods, and the country of Yemen; their construction was earlier explained[33], and reference is made to Chapter 1.

*Note 33. See Part II, vol. 2 (Art. 161, p. 164; Art. 184, p. 174); also vol. 3, a(Art. 6, p. 25); of this Handbook.*

43. Masonry Vaults.

Vaults were built of ashlars, cut stone, bricks, and also cast in gypsum, the stones being either set without mortar , (Hauran), or with pozzulana mortar in subterranean vaults, replaced by gypsum mortar in vaults above the ground. The execution of the vaults in nowise differs from the procedure common in the southern conquered provinces and in those further north, before the invasion by the Arabs.

Nearly all forms of vaults known to the Romans, Byzantines,

Persians(Sassanians) were likewise employed with slight modifications by the adherents of Islam: also all visibly projecting ribs were suppressed as in Roman architecture, excepting those domes, which are imitations of S. Sophia.

The section of the vault is sometimes semicircular, and it sometimes assumes all the varieties of the pointed and keel arch or of the horseshoe and bulbous forms.

We find tunnel vaults freouently broken by other tunnel vaults, without this being reouired by the plan.

The cross vault suffered a transformation in ashlar constructions by a peculiar shape of the keystone. This takes an octagonal form and its vertical surfaces are closed by a horizontal decorated slab, or they are crowned by a small ribbed dome or one ornamented by stalactites. The surfaces of the vault are broken to correspond, each one being subdivided into 2 or 3 surfaces (Figs. 34, 35; cross vaults in the Okella Kaitbey at Cairo and in the Mosoue at Ephesus). A dwarf dome with stalactites as the enclosing form is shown by the Mosoue of Barkook in Cairo. The simple form of the cross vault with cross-shaped keystone is not excluded here.(Compare Mosoue of Mohammed-el-Gauly at Cairo).

The construction of a limestone dome of 17.71 ft. span from the Tomb of a princess of Sultan Aschraf-Berisbai (BursbegU in Cairo (1431 A.D.) is given by Fig. 36, and that of a double=shell brick dome with a wooden connecting framework from the Mosoue of Musjid-i-Shah in Ispahan (from Coste, Plates 14, 15) may be seen in Fig. 39.

From the thickness of the walls of the domes, definite rules for them can scarcely be deduced, for with abutments of eoual strength, it is sometimes made very considerable, sometimes extremely slight, for example, only being 15 inches for the two domes of the Tomb-Mosoue of Barkook. The depth of the ribs is generally the same from the springing to the keystone, and the masonry behind it is not bonded with the arch, while for domes, a reduction of theckness towards the crown sometimes occurs.

44. Plaster Vaults.

The perforated vaults of cast plaster are cast in moulds made of Nile mud on a wooden centering, removed immediately after the casting, so that ornaments of the interior may be carved

and worked while the plaster mass is still soft.(Examples of such plaster vaults in the Mausoleum of Shech-el-Manani (Fig. 40) in the Bab-esch-Scharia quarter in Cairo and in the Baths (see Chapter 5 under d) at Cairo.).

45. Pendentives.

Although domes on pendentives were common in the border lands of the Arabs, were invented there, and the mightiest example in the East, the dome of S. Sophia, already stoom complete 100 years before the appearance of Mohammed, the Mohammedan architects brought them into no system of general construction, before the conquest of Byzantium. They frequently returned to the most primitive solutions, and instead of pendentives over the angles, they placed beams and slabs as supports of the polygonal or round domes, as in the ancient structures in the Hauran, (compare domes from Chagga and Ezra[35]), or they placed wall arches to form the transition from the square to the polygon as shown by Fig. 41[36], the chapel before the mihrab of the Mosque in Cordova, or the Mausoleum of Sultan Hassan in Cairo.

*Note 35. See Part II, vol. 2. (Fig. 151. p. 177) of this Handbook.*

*Note 36. Facsimile reproduction from Allgemeine Bauzeitung. 1856. Pl. 33, Fig. 1.*

Connection of Arch with Pendentive.

A peculiar connection of arched construction with the pendentive is shown by various buildings of the Arab Osmanic period in Cairo; one of the finest examples of this is preserved in the hall of prayer of the Medressa of Mohammed-abn-Dahab in Cairo.(Figs. 42 to 44).

Here again appear the arches A, omitted in the stalactite period, and the vaulted niche B projecting beyond the former, yet again subdivided in trefoil form, and in connection with star-shaped pendentive surfaces, which make the transition downwards into the vertical walls of the monument. A few stalactites ornament the upper part of the niche and the consoles supporting the arch.

The transition in the interior of the dome from the octagon to the sixteen-sided drum is effected by spherical pendentives D of projecting stones made even on their upper surfaces, and which support the sixteen-sider drum of the dome in common with the arches themselves.(Fig. 44).

47. Stalactites.

Probably not before the end of the 12 th century A.D.(the stalactites occurring on the facade of the Gam-el-Akmar from the first half of the 12 th century are the earliest in Egypt, in our opinion), and after the Arabs had long since become acquainted with the vaulting with corbelled stones usual in India, they generally abandoned the mode of transition from the walls to the dome employed by Romans and Byzantines, by means of spherical pendentives or by niches placed in the four angles, (Fig. 11, p.18), and replaced them by corbelled stone courses, and perhaps as a reminiscence of the earlier niches, these were decorated by small niches of different sections set side by side with an occasional change of axes.(Fig.45). By repitition of so many motives placed beside and over each other was produced a monotonous form of pendentive, that generally ended in a circle of niches extending entirely around the drum.(Fig. 46). To relieve this monotony, niches of different sections, of segmental, semicircular, elliptical, prismatic, or foliated form, were employed. The surfaces of the niches were usually covered by ornaments (Fig. 47 37), and their recesses were sometimes closed by thin perforated plates.(Fig. 120). But to produce more variety and deeper shades in the forms of pendentives, usually placed high up and not well lighted, several niches were grouped at the upper end of the pendentive, developing downward into a console, so that either the base wall with or without openings for light (Figs. 47 to 50) appeared between them, or an entire dwarf dome was inserted. Thus the beginnings of the vault or extended ribs but partially laid on the surfaces of the pendentives, so that surface ornaments were visible(Fig.50); the others were suspended in the free space and conferred on the entire design the name of stalactite, while they were designated by the name of "moarnas" in the Arabic language. The latter appellation must indeed have meant icicles, from which one would be justified in concluding, that these forms originated in a country, where ice was known. Since a certain kind of stalactites is called "moarnas Halebi (of Aleppo), it would perhaps be permissible, so long as this view is not opposed by facts, to assume Syria to be the native country of stalactites. This branch of art received its highest development in Spain.(See

works on the Alhambra).

*Note 37. Facsimile reproduction from Bourgoin, J. Precis de l'Art Arabe. Plate 52. Paris. 1889 et seq.*

In the same manner as on the pendentives, stalactites were treated on horizontal or concentrically arranged cornices and on the corbellings of minarets (Figs. 53, 63); capitals and consoles are also covered by them. We give examples of cornices in Figs. 57 and 63, with that of the Mosque of Bibans-el-Khaiat (Guderiye at Cairo) and that of the Sebil of Kaitbey (Salibeh quarter there), as well as one such from Constantinople, belonging to the Osmanic period (Fig. 52).

The material of stalactites is stone on the facades of the monuments in Cairo; yet gypsum is not excluded. But gypsum predominates in the sculptures of Egyptian interiors, as in most other provinces of the caliphate. Of such executed in terra cotta, we have seen only those in Broussa, also including their existence in Persia.

Those made of wood are generally found in the mimbars, kurses or bay-windows and marquises, in ceiling constructions in mosques and secular buildings.

But stalactites of wood are only in the rarest instances carved from solid blocks, they far more frequently consist of separate prismatic bars with angles removed and fastened together by glue and nails (Fig. 54). The reason for this treatment indeed chiefly resulted from the cost of large blocks of wood, from the convenience of oriental workers in wood, from the primitive forms of their tools, as well as from the fact, that the durability of this combination in a mild climate could not be criticized.

48. Wooden Domes.

As a unique example of a dome built of wood in the earliest period should be mentioned the octagonal dome of somewhat more than 65.6 ft. diameter over the Dome of the Rock (Mosque of Omar) at Jerusalem. It fell[39] in the year 1016 and was again rebuilt in the year 1022.

*Note 39. An illustration of this structure is published in Vogue, M. De. Le Temple de Jerusalem, etc. Paris. 1865.*

A wooden dome of 48.9 ft. diameter internally on the 8.86 ft. thick walls of the Mausoleum was built by the mother of Sultan

Kamel in the 18 th century A.D. over the Tomb of the Imam Schaffer near Cairo, probably after the fall of the masonry dome. It is externally covered with lead and is internally lined with ornamented boards.

Smaller timber-arch domes, commonly of primitive construction, are found in the ceilings before the kiblahs of the mosques and over the durkah of the Kaab in secular buildings. (Fig. 207).

49. Tie-Beams of Arcades and Vaults.

The closely connected type of plan shown by the great vaulted buildings of the Romans, in which the most resisting means were found in the arrangement of the plan of the building[40], were already abandoned by the Byzantines. But this freedom made other precautions for stability necessary, and we find in the more varied and bolder placing of the columns connected by arches, and where great vaults rest on weak piers, the thrust of arches and vaults is frequently no longer resisted by massive masonry; it was sought frequently to neutralize this by directly inserting wooden or iron ties.(Figs. 55, 56).

*Note 40. See Part II. Vol. 2 (Art. 80. p. 107) of this Handbook.*

The visible ties first occurred as a "structural innovation" among the Byzantines and were retained by their pupils, the more nervous and careful Arabs. They were just as necessary for the arcades of the mosques extending in long lines, as for Byzantine colonnades and arcades, and their further purpose of supporting the lamps of the mosques by hanging these from them, became a chief use, or rather a utilization of a structurally necessary element for the purposes of decoration.

These ties (or tie-rods) consist in both Byzantine and Arab architecture, of wooden beams inserted in the masonry of the piers; but they were also made of iron (as in the aisle of S. Sophia); still wood remains the most common material. In the buildings on Mt. Athos, two or three such wooden beams are inserted above each other in the arcades, in order to obtain a more secure longitudinal tie between the walls with numerous openings.(Fig. 58, right).

Greater stiffness is produced by inserting wide planks at the spinging of the arches, as found in S. Dimitri in Thessalonica.(Fig. 58, left).

In tunnel vaults, an effective tie was obtained by a series of longitudinal wooden beams laid in the external walls on the right and left of the vault and connected together by transverse beams.(Fig. 59).

For cross vaults and domes on pendentives, the wooden tie-beams were placed at the height of the imposts or somewhat higher, and in the latter even the pendentives were connected together by diagonal ties, as in the Basilica at Philadelphia (Asia), where the tie-beams at the height of the imposts form a framework of beams 13 3/4 to 15 3/4 inches thick, and diagonal ties were employed as a superfluous precaution.(Fig. 60).

For domes on drums, the walls of the drum were tied together by wooden ties forming polygons, these ties extending through the middle of the windows in the drum. Several of these are indeed arranged above each other in the domes on Mt. Athos. The ties always pass through the centres of the openings; wherever an opening occurred in the solid masonry, a tie was put through it, even if it only remained until the mortar had hardened.

At the time of the Ottoman invasion, these wooden tie-beams were suppressed and iron ties became usual and were always left visible. Thus are the vaults of the great mosques held in constantinople, and these properly illustrate the reminiscences of Byzantine architecture.

A distinction was made between wooden tie-beams only remaining temporarily and those inserted permanently in the structure. The latter were generally carved, covered by ornaments, and they have remained until our time. The function of these tie-beams was also frequently to prevent the yielding of large arches, between which smaller ones were inserted, i.e., they were affected by compression, and in other words, they served as "struts."(Fig. 59). The finest example, most interesting in the history of art, of such carved tie-beams in Egypt is found in the ruins of the Fatimide Mosque of Saleh-Telay at Cairo.(Fig. 61).

The premature removal, or in the given case, the removal of the struts throughout frequently becomes fatal. Fresh masonry is thereby distorted, so that one was often compelled in great haste to replace the wooden tie-beams removed by carefully

connected iron tie-rods. The result was that architects in the following centuries seldom dared to erect vaults without visible ties.

50. Joinery.

Concerning joinery in general among the peoples of Islam, it may be said, that in the ancient monuments and in modern practice is found the endeavor to avoid difficult jointings in wood. They sought substitutes for these by nailing on prismatic wooden parts and by using iron and brass bands and corners (Figs. 53, 62, 63[42]). Yet we already find dovetail joints on the tie-beams of the piers of the Mosque of Abn-ibn-Tulun and in the frame pieces of the oldest Kamarije in Cairo.[43].

*Note 42. Facsimile reproduction from Bourgoin's Precis de l'Art Arabe. I. Plates 13, 16. Paris. 1889 et seq.*

*Note 43. Same work: Plates 11, 13, 16.*

51. Roofs.

In Syria (Hauran) and in the country of Yemen, the Arabs constructed their roofs of a coating laid on the horizontal stone beams of the ceiling of the uppermost story, so that a terrace roof resulted.

In Persia (as in some parts of S. Italy), the masonry dome is covered by stucco and forms the roof.

In the valley of the Nile, the walls of the dwelling of the fellah are made of Nile mud, and the roof consists of palm trunks and the leaf stems, which are covered by corn stalks[44] or a coating of Nile mud.

*Note 44. Corn is Dura in Arabic.*

On the buildings of the Alhambra, there came into use the antique flat and concave tiles, still common everywhere in the South, with variegated glazed tiles for covering the domes(apses).

For houses of masonry with living rooms vaulted or spanned by stone beams, this mode of roofing was extended to the rooms of the upper story, and their ceiling vaults are leveled up externally and also form the roof, according to antique custom. The protecting roof above them, made of wood and covered with tiles, was so much less required, since it was preferred to utilize the flat masonry roof as a terrace.

In Spain, in the Balkan peninsula, and in other countries, in which a certain abundance of woods was still available, recourse was had to the ancient wooden roof as well as to the covering

with the antique flat and concave tiles, in this following the rules of the Byzantine instructors. As a protection from the sun's rays and the winter rains, the roofs were made to project far beyond the faces of the walls (Figs. 64 to 67), the roof surfaces being sometimes nearly horizontal, sometimes steeper, frequently rising at an angle less than 30° to 40°, sometimes plane, and sometimes built in the form of a keel arch. In public buildings, visible trusses were constructed (not concealed by an interposed horizontal wooden ceiling), an example of which has been given in Fig. 5 (roof truss and ceiling od the aisles in the Mosque of Cordova). Other allied constructions are preserved for us in the Cathedral of Monreale and in the Chapel Palatine in Palermo[46].

*Note 46. See Hittorf and Zanth. Architecture Moderne de la Sicile, etc. Plates 45, 46, 67, 68, 70, 71. Paris. 1826-32.*

A beautiful example is also given by the roof truss of the little Mosque of S. Felipe di Xatira[47], in which the plane roof surfaces have been replaced by curved ones. (Fig. 64).

*Note 47. See Mothes, O. Baulexikon. 3 rd edit.: vol.3. Figs. 2097, 2098, p. 315. Leipzig and Berlin. 1876.*

The rafters are closely set usually on these roof trusses, are covered by carving and painting, and together with the purlins form narrow coffers, likewise decorated by carving., always picked out by painting in dark colors. In this case, the roof has a polygonal (trapezoidal) form, joined by a continuous plate at the end of each tie-beam.

In other cases, the space is subdivided also by heavy purlins resting on the gables of the cross walls, supported by wooden caps and consoles, the rafters resting on them, which together with the sheathing always produces richly carved and brightly painted internal ceiling surfaces.

52. Cornice on Rafters.

The **strongly** projecting roof surfaces mentioned, or cornice projections, either consist of overhanging rafters supported by purlins, plates and posts, or besides the large rafters of the roof, smaller projecting cantilevers are inserted (Figs. 64, 66, 67), a system of construction especially peculiar to Spanish=Arab buildings, and when carved and painted in this place, allow the intervening star-shaped panels to be conveniently seen.

A carved board frieze extends beneath them along the wall and deep corbels are placed beneath the tie-beamr and at the angles.

The dimensions of the projection of the wooden cornice or projecting roof are also sometimes arranged in accordance with the height of the rooms of the story next beneath, when the external window shutters open outwards, extending to the edge of the cornice when they are open, to which they are fastened by bolts.(Fig. 68). Instead of visible rafters, we find especially on Osmanic buildings the projection of the roof sheathed over horizontally, the surface of this sheathing being decorated by ornaments.(Fig. 69).

53. Staircases.

We have no knowledge of grand staircase designs in Arab art. The mosques are chiefly arranged in a single ground story raised above the ground, and they have before their principal portal a staircase in one or two flights with a simple balustrade of solid or perforated marble slabs.(Fig. 70). The ascent is generally guarded by doors as a precaution against unclean animals.

In the palaces, the stairways leading to the chief apartments of the Harem are mostly of small width in proportion to the dimensions of the rooms, and the balustrades are usually of wood. The staircase hall itself is usually simply decorated, this being limited to the ceilings of the different flights and to mosaics in white and black stone.

The stairways at the entrance and to the stories chiefly consist of stone steps, with or without mouldings, which either extend between the masonry walls or, as in the buildings of the Hauran, are open along one side (Figs. 71, 72); or they are constructed of thin limestone slabs on flat arches with limestone tile ceilings extending but little into the masonry (Fig. 73). The flights are broken by similarly constructed walking spaces, which are often made quite large. Gypsum is likewise employed here for the masonry and for setting.

Instead of stairs with steps, there are also inclined planes with inserted and slightly projecting cleats.(Fig. 74).

54. Windows and Fixtures.

The window openings are secured by lattices of wood, bronze, or iron, or by slabs of stone or plaster of paris. The lower

window openings of a mosque are usually filled with metallic lattices, while those of secular buildings have lattices of turned beechwood; but those of the upper stories and their projecting bay-windows have lattices and traceries.

The use of perforated and ornamented stone slabs for closing windows, as in the Hauran or as in Byzantine art, is rarer in Egypt and is only usual for the smaller window openings. They are quite common in India under the name of "jalis".

Perforated lattices of stone or plaster of paris are already found early among the Mohammedan races, the oldest being perhaps an opening for light beside the portal of the Mosque of Cordova. Here occur Greek forms and intersections in the lattice bands, like those on the marble lattices of S. Apollo Nuovo in Ravenna. We likewise already find in S. Vitale and in the Cathedral there interlacing bands on ornaments, which later played a great part, when developed in the Arabian style; except that the filling ornament is there Byzantine. Therefore no doubt remains, that we have to seek here the prototype for the Arabian lattices, even if this received a substantial transformation by translation into the complex form of interlacing. We find their system already developed in the earliest examples of this style, in those of the Mosque Tulun, which from their surroundings indeed belong to the era of the founding of the building (Figs. 76, 77), and indeed mostly in such a manner, that it was but a slight advance to ornament the openings of the lattices with thin sheets of colored glass, thereby producing a kind of tracery. The severely geometrical forms of the tracery were later abandoned, and these were replaced by definite forms of plant ornament (Fig. 78), of cypress, of pinks in a pot, fanciful structures, bands of inscriptions, etc. To produce them, frames of wood 1 1/4 to 1 5/8 inches thick were joined by dovetails at the angles, and in them was cast a slab of plaster of paris of the size of the opening and 1 1/4 to 1 5/8 inches thick, the desired ornamentation being carved on the surface before the plaster had completely hardened, the perforations being then covered by glass sheets (Fig. 79). Hence the perforations were beveled off by strongly raised kamarijes according to the point of view of the observer standing inside

(Fig. 78), so that the colored design of the ornament next the exterior would not be concealed by the plaster tracery. At an earlier epoch, when the tracery had larger perforations and it was almost exclusively executed in geometrical forms, as for example on the Tomb of Bibars in the Gamalije in Cairo of the 13 th century A.D., this chamfering was unknown. Here bars about 1/4 inch wide are left between the geometrical forms of the tracery cut in the plaster slab, on which the polychromatic sheets of glass are fixed at right angles to the bars by means of plaster ribs b (Fig. 79), perpendicular to the surface of the glass.

These enclosures are protected from external injury by nettings of copper wire of the form given below.(Fig. 80).

Doubtless window openings were earliest filled by lattices of wooden strips (Fig. 81, k), behind which were wooden shutters of the simplest kind. Framed lattices later came into use, frequently with moulded bars, whose forms and joinings indicate a Japanese or Chinese origin.(Fig. 82, n, o, p, o).

The lattices of turned beechwood[49] (Figs. 81, a, b, c, e, f, i, m; Fig. 85), called "mushrabiyeh" by Europeans cannot be older than the second Mameluke dynasty, as for example those on the grille of the Tomb in the Moristan Kalaun, those on different division walls in the Mosque El-Azhar, and on some pieces preserved in the Arab Museum in Cairo. Therefore the forms of lattices shown in Fig. 82 must be older.

*Note 49. The name of "mushrabiyeh" is formed from the Arabic word "scharab"(drink). Clay vessels for cooling water for drinking were usually placed behind the lattices. The native name in Egypt is "chart".*

They found very extensive employment in the openings of the projections in the upper stories of secular buildings in Cairo, and they largely contributed to give the street that peculiar character, still exhibited by the older portions of the city. (Fig. 15).

In finer works of this kind for the decoration of the internal arrangements, ivory, ebony, and mother-of-pearl were used.

The true Arabian bronze and iron grilles for mosques, "sebils", and the better secular buildings, were made of round longitudinal and transverse rods 1 to 1 5/8 inches diameter, and they

form a regular **rectangular** grille with openings about 7 7/8 inches square with square pieces at their intersections, having corners full or beveled off, or also hemispheres whose surface is sometimes smooth, sometimes chased (Sebil Kaitbey, Salibele quarter in Cairo), while the grilles of the Osmanic period mostly exhibit network forms, which already exist in Byzantine art.

Whether the metallic grilles belong to mosques, sebils, or to secular buildings, they usually have the shutters mentioned with wooden lattices.

55. Doors.

In the richer treatment of a building, the shutters are frequently decorated by paneling with inserted panels or engraved bronze plates as for doors; the latter were frequently constructed of artistic panelwork of the most varied and costly woods, with richly inlaid designs; the small and usually polygonal panels are overlaid with ivory, ebony, and mother-of-pearl, while the bands forming geometrical ornament show delicately profiled mouldings. An example of a door without any ornamented parts or any metallic fittings is given in Figs. 83, 84.[50]

*Note 50. After Bourgoin. Les Arts Arabes, etc. Paris. 1868-1870.*

Such doors are found, whose external surfaces are partially or entirely covered with brass plates on which richly ornamented bronze plates 3/16 to 3/8 inch thick are fastened by nails with fanciful chiseled heads. The upper and lower panels exhibit broad ornamental inscriptions enclosed by perforated bands, while in the middle one is inserted a geometrical arabesque or an elongated medallion, ending in free forms with conventionalized lilies.

There are finally to be mentioned the doors in Cairo covered by iron bands and iron nails, and which were especially common, when the Mamelukes used to fight in their feuds in the streets of Cairo. Ewen in these works, the Arabs did not lack taste, for they represented artistic interlaced designs by a thoughtful combination of nails with wide heads of polygonal shape on the surface of the door.

All decorations of the leaves of the door are treated as surface ornament' the sole projecting ornament is formed by the knocker, whose form is shown by Fig. 86[50], together with certain perforated ornaments, and lastly the chiseled nail heads.

The finest of such doors is found in the entrance door of the Moayed Mosque, though taken from the Mosque of Hassan.

*Note 50. Bourgoin. Precis de l'Art Arabe. Paris. 1889. Palte 44.*

The two methods of decoration mentioned, inlaid paneling and metal overlays frequently occur together on the same door, when the metal overlay is on the exterior.

The wooden bar, which supplies the place of a lock, is fastened by small sliding pieces of wire. It can be opened only by making a piece of wood with corresponding projecting wires for raising these bits of wire (Fig. 87). These were frequently ornamented by costly inlaid work.

The lower wooden angle pivots shown in Figs. 83 and 84 were frequently replaced on heavy entrance doors by iron ones of conical form, welded to heavy angle bands nailed on the corner, extending into a metal step inserted in the threshold.

The iron bolts found in Egypt nearly all had the primitive form shown in Fig. 88.

Lighter leaves of doors, particularly those for the numerous cupboards, were usually hung with pairs of nails with joined eyes (Fig. 88) instead of with hinges. Otherwise they are like the antique Roman metal fixtures still rarely found in Palermo and Pompeii.

Some overlaid bands of rich execution in bronze with silver inlays appear in the fastenings of Koran chests of Sitte Khawand-el-Baraka and of Sultan Ghuri, the former being in delicate inlays, the latter covered with engraved bronze plates(Fig.89).

In Egypt are likewise found costly examples of fastenings in wrought silver on doors, lattices, and tombs, especially of venerated sheiks.

## 56. Heating.

The warming of the rooms (so far as required by the purpose of the building or by the climate) was partly done in the Roman way (compare Baths of Mohammed II in Constantinople) or in a special manner, explained in connection with the Arabian Baths in Egypt.

## 57. Floors.

Floors of all the better buildings were composed of mosaic of small pieces of marble; this was introduced by the Byzanti-

Byzantines, as indicated by the Arabic name"Fseisissa[52]"(See examples of marble mosaics on p. 1 and in Art. 88, p. 35).

*Note 52. According to Fairsabadi's Dictionary: "El Susseisissa" The short u was apparently dropped later, after the Greek mephosis, since many technical expressions of the Arabic language are derived from the Greek.*

58. Wall Surfaces.

As among the Byzantines, the wall surfaces were likewise covered by mosaics, by marbel slabs, or they were ornamented by brightly colored faience tiles, or they were simply plastered in ordinary buildings.

The oldest Arabian faience tiles with Cufic inscriptions are of very small dimensions, for they are only about 4 inches in length. Their ornaments are in slight relief.

The walls of living rooms were covered by the Arabs also with paper in bright colors, on which were fastened perforated arabesques or inscriptisns.

59. Polychromy.

As the case with all oriental races (Etruscans, Greeks, Persians, Egyptians, etc.), the art tastes of the Arabs preferred polychromatic to colorless architecture. The subdivision of the colors is always arranged by them with much taste and technical skill. The upper surfaces of all the walls of the Alhambra were once covered with gleaming colors; the same is true of the external walls of most mosoues.

The more prominent polychromy of kinds of marble of bright colors, with natural and artificial stones of many colors, with a freouently hard alternation of colors in the courses, (black and white, red and white), with the colored faience, etc. of the Byzantines and Persians, were always preferred in the art of Islam.

The colors chiefly employed by the Arabs in Egypt in their decorations were red, blue, and yellow (gold); but they also used green, white (silver), and also other secondary tones of color.

Owen Jones[53] has shown that only three colors, blue, yellow (gold) and red were employed in the Alhambra (with the exception of the faience tiles on the lower part of the walls). The tones were separated by white outlines or bands, or by the shadows of the skilfully wrought ornamentation.

*Note 53. See Jones, Owen. Grammar of Ornament. p. 72 of German edition. London & Leipzig. 1865.*

Le Bon[54] believes that the white marble shafts were gilded, since their white color would have destroyed the harmony of the rich magic of the colors.

*Note 54. In La Civilization des Arabes. p. 578. Paris. 1884.*

The other colors found in the Alhambra:-- green, brown and purple, according to Owen Jones, are derived from an alternation of originally metallic colors (blue in green), and from mistaken restorations by the Spaniards at different times.

60. Skill in Art in other Domains.

The artistic skill of the Arabs in the making of furniture, in the production of costly fabrics and carpets, in carving wood (on projecting cornices on roofs or on balustrades of terraces, which recalls allied work on the Swiss and Tyrolese houses), in gilding and enameling glass (lamps of mosques), in the making of state and service weapons (damascened work), will be merely intimated here.

61. Value of the Execution.

It has frequently been objected to the Mohammedan buildings, that they were not solidly constructed; but this is not generally true. Certain buildings, among which are chiefly dwellings, were certainly not better built by the Arabs, but generally worse than others, yet where they judged it necessary, they constructed them so well, that in spite of defective maintenance, many of them by an age of 800 to 1000 years make this objection erroneous.

What the Arabs did not understand, and which seems to be a characteristic of the Semetic races, is the expert maintenance of their architectural monuments. Yet this may also in many cases be caused by the frequent change of dynasties. What did it concern the new usurper, if the works of the ruler overthrown by him fell down! He could only desire this! To this was added a superstition that the perfect completion of a building indicated the near end of the monarch.

## Chapter 4. Architectural Forms.

### 62. Architectural Styles.

It is self-evident that the architectural forms are not the same in all the Mohammedan countries, and also that these did not continue the same during the lapse of time. We must divide them in accordance with the architectural styles and subdivide them again according to the various provinces. From the present condition of our knowledge of the architecture of the adherents of Islam, according to the precedent of Le Bon,[55] we may assume the following grouping with their subdivisions, as well as their sequence.

*Note 55. Same Work. p. 597.*

1. The Arabic style before Mohammed, so far little studied, comprising the monuments in the province of Yemen and those of the ancient Arabian kingdom of Syria, for example, the buildings of the Ghassanides.

2. The Byzantine - Arabic style extends throughout the countries next mentioned and occurs in the chief buildings here indicated.

a. In Syria, the Mosque of Omar in Jerusalem and the Great Mosque in Damascus.

b. In Egypt, the Mosque of Tulun in Cairo.[56]

*Note 56. Of the Mosque of Amrou, merely some portions of the enclosing walls of the older period, some antique marble columns, and remains of the ancient wood carvings now exist.*

c. In Africa, the great Mosque in Cairwan and some old mosques in Algiers.

d. In Sicily, the monuments preceding the Norman conquest and the Palaces of Zisa and Cuba in Palermo.

e. In Spain, the Mosque in Cordova and the monuments in Toledo before the end of the 10 th century.

3. The pure Arabic style developed itself steadily from the 10 th to the 15 th century and attained its highest degree of completeness:--

a. In Egypt, in the Mosque of Kaitbey in Cairo.

b. In Spain, it is found in the best preserved typical monuments in Seville and Granada.

4. The mixed Arabic style originated in Spain, Persia, and India, where it combined Arabic forms with elements from

Christian architecture, from the architecture of the Persians and Hindoos, belonging to the period before the two peoples last mentioned had accepted the religion of Islam.

a. The Spanish-Arabic style appeared when the Christians reconquered Spain, and many monuments in Toledo bear its special characteristics.

b. The Jewish-Arabic style came into existence in the synagogues of the Spanish Jews. Some of these buildings in Toledo owe their present existence to the fact, that they were transformed into churches.(S. Maria la Blanca, El Transito, etc. in Toledo).

c. The Persian-Arabic style chiefly appears in the mosques in Ispahan.

d. The Indian-Arabic style developed itself most beautifully in the monumental Gateway of Allah-ed-Din and on the Temple of Benderabund.

e. The Indian-Persian style or Mongol style of India occurs in the Palace of the Great Mugul and in many mosques. Its monuments indeed exhibit a peculiar style, yet without real originality. The foreign, i.e., adopted elements are rather joined together, than worked over. -- To these is also to be added:--

5. The architectural style of the Osmanic period, which comprises the monuments, which originated under the influence of S. Sophia in Constantinoble, and which still prevails there at present.

63. External Wall Surfaces.

The external wall surfaces of the buildings are almost invariably smooth; projections rarely break the monotonous external architecture; no effective distinction of the stories by a varied treatment or by the mode of dressing portions of the wall, or of its elements is attempted; no animation of the wall surfaces by columns or pilasters is to be found; at most are there smooth projecting masses of the wall, arranged like buttresses, and which subdivide the surfaces, as for example, on the southern external side of the Mosque in Cordova, on the facades of the Mosques of Bibars in Cairo and in Khanka, as well as free columns in the loggias of the Sebile, or single columns set in the angles of the monuments.

Yet a decoration of the surfaces is sought and executed by

Yet a decoration of the surfaces is sought and executed b: courses of stones of different colors, by an affected jointing of the facing of the upper surfaces of the walls, that makes them appear as if covered by a carpet or tapestry pattern (as for example, on the Sebil Abd-er-Rahmun-Kathuda in Cairo), by the addition of raised or sunken bands (gilt ?), and by the use of raised or polychromatic mosaic arabesques. Favorites in Spain were made of small natural or artificial stones composing relief patterns, which like a network covered the wall surfaces (interlaced circular and polygonal forms) as surface ornamentation, and lastly of the addition of the so-called dentil or string-courses, of which the Tower of S. Miguel and the apse of the Cathedral of the Seo in Saragossa exhibit rich and charming examples.

The external walls vere seldom rest on an effectively expressed base; no plinth forms the transition from the foundation masonry to the walls of the story; in Egypt, Spain and Persia, effective plinths on the walls belong with rarities.

In Sicilian monuments (Ziza in Palermo), blind arcades occur as bold surface ornamentation, and in addition thereto, the separation of the stories by horizontal bands on the exterior is well and skilfully expressed.

The covering of the external walls with brightly colored and glazed terracotta, common in Persia and other countries, has already been mentioned.

64. Cornices and Battlements.

String-courses, bands, and mouldings separating the stories, are not usual; they were employed on the Ziza in Palermo as plain and slightly projecting bands; in Saragossa (Tower of S. Miguel), they rest on console-like projecting courses of bricks.

Boldly projecting main cornices, that produce a proper crowning of the edifice, were not generally common; men were usually satisfied with a simple and slightly projecting string-course, above which rise the characteristic battlements, that are sometimes merely as if for fortification, sometimes are purely decorative in fanciful forms, are light and gracefully treated and form the parapet for the terrace roof. If the wall surfaces are animated by buttress or tower-like projections,

the battlement cornice is accordingly carried around the projections, as on the Mosque in Cordova, where the plain moulded bands are doubled, i.e., are arranged in two series above each other, and they produce a good ending.(Fig. 90).

The angles are sometimes crowned with half battlements or by flowers, curved to fit the angle of the wall, or pier-like additions intercept the course of the battlements at these places.

65. Water Spouts and Drips.

Water-spouts are chiefly of simple form and lack artistic development, as shown by the adajacent examples from the Gateway Bab-el-Mitualli and the Mosque Malakeh-Sofia in Cairo.(Figs. 93, 94).

The same form of discharge pipe also occurs on the drinking fountains, sometimes in form of a conventionalized lion's head, as near the Bab-el-Wezir in Cairo.

66. Overhang of Stories.

On narrow streets and to increase the area of the building in the upperstories, an overhang of the stories also occurred in Arab cities, forming corbels of the adjacent artistic forms, (Fig. 92), that had to receive the front wall.

Inserted wooden beams then transmitted the greater portion of the load to the transverse walls.(Fig. 95).

Only portions of the facade overhung like bay-windows, these extending through one or more stories.

The ground story supports the upper stories and is generally monumentally treated with vaulted ceilings.

67. Cut-off Angles.

At the intersections of narrow streets, the angles of the ground story were usually cut off by a plane, to obtain more space for street traffic. Most solutions of this problem are charactesistic and beautiful, as shown by Figs. 96, 97.

Acute angles in the lower parts of the building were therefore avoided, so that reentrant angles with inserted columns came into use, a beautiful example of which is given in Fig. 98, an architectural work in which also appears in use a bold stalactite main cornice and a regular alternation of the ashlars with bands of another color with ornamented surfaces of some ashlars.

68. Wooden Ornamentation.

Of the form development of wooden projecting roofs and cornices with projecting boards with sawed ornamentation, Figs. 99 and 100 afford notable examples. We find this graceful decoration on the Sebils and the angles of houses, already referred to in Art. 8. Narrow wooden boards are set side by side, cut with fanciful outlines and employed as suspended ornamentation, like lambrequins (notched fabrics).

The West is able to show the same forms on its wooden buildings under like conditions. To Whom can the right of earliest use be ascribed? These must be regarded as similar results, that originated independently from each other in different countries from some peculiarities of the materials and the kind of ornamentation resulting therefrom.

69. Doorways and Portals.

The wall surfaces are animated and pierced by doorways, windows, niches, and bay-windows. We find these with severe regularity in the Palaces Ziza and Cuba at Palermo and in the mosques, with usually more freedom in houses, whose exteriors are scarcely worthy of mention in respect to architecture.

Special emphasis was laid on an architectural rich treatment of the chief entrance doorways, in accordance with ancient custom; on the mosques, these often form the most important ornamental portions of the entire architectural design.(Fig. 101).

The opening is a vertical rectangle, horizontal or arched at top. When rectangular, the lintel is either composed of a stone beam relieved by an arch, its face richly decorated by skilful ornament (Fig. 102) enclosed by a band, or it consists of a horizontal arch, with the previously mentioned artistic jointing, either real or merely imitated by veneering. The transfer of the panel ornament to the lintel is an innovation in form, opposed to its former division into bands, or treatment, excluding ornament from this architectural member.

The forms of arches employed are either the Byzantine round and horseshoe arches or the new pointed and ogee arches, foil and trefoil arches.

The portals are frequently arranged in the form of rectangular niches, in whose rear wall is found the entrance doorway, while the niche terminates above with stalactites and small

domes.(Figs. 104 to 107 from the east portal of Mosque Kesun in Cairo).

The arched top was again frequently squared by an architrave, and for decorating the spandrels of the arch, instead of costlier marble mosaic, an inlay of a resinous and rapidly hardening composition was employed; the ornament was sunk in the stone to a moderate depth and the composition was then filled into the incisions while hot and then polished, being in different colors, especially black, red and blue.

The voussoirs, as for horizontal lintels, frequently had their external surfaces ornamented by skilful decorations. On the doorways of the Mosque of Cordova, on both the straight and horseshoe arches, the voussoirs are all decorated in this manner, and the spandrels are likewise filled by sculptured ornaments.

On the mihrab of this mosque, all cut stones of the horseshoe arch are covered by small ornaments on alternately light and d dark grounds.

This ornamentation of the voussoirs is an innovation peculiar to the Arabs, which distinctly breaks with the traditional archivolt members (the curved architrave of the ancient peoples). To many, this treatment of the voussoirs may appear more esthetically correct, than that of antique art.

70. Windows and Niches.

What has been said then likewise applies to the windows and niches; excepting that a multitude of fancifully treated forms appear in their upper part, and which are preferably applied to the openings and niches of the minarets and mimbars of the mosques.(Figs. 108 to 112).

Circular and hexagonal windows with very rich borders occur (Figs. 113, 114), as on the Mosque of Hassan at Cairo, Fig. 98.[58]

*Note 58. The monument generally known as the Mosque of Hassan is a Medresseh.(School).*

The grouping of windows in twos or threes with the addition of round openings and the arrangement of many similar forms to form a whole was already employed in early buildings, but with especial preference in Spanish-Arab and Jewish-Arab structures. The development of these proceeds from the simplest conceivable to the richest fanciful forms, the interposed supports and walls

are sometimes plain wall piers, sometimes artistically wrought columns.(Fig. 114). With reference to the various architectural systems, the richest forms are shown by Figs. 116, 117.

Niches are rectangular (Fig. 120), segmental, or semicircular in plan, in the last case being likewise covered by a round arch. the spherical surface is then covered by marble mosaic, or by a shell as in Syrian-Roman buildings, as executed in the most charming manner in the kiblah of the Mausoleum of the Moristan of Kalaun at Cairo. The cylindrical surface is there covered by a zigzag pattern of inlays of mother-of-pearl, yellow, red, blue, and black marbles, the delicately grooved shell with its lobed edge being made of white marble, which rests on a curved architrave, that is supported by small white marble columns.

The closing of doors and windows by glazed perforated slabs of gypsum, lattices, turned lattices, or wooden leaves with or without metal fastenings, wooden shutters, their fastenings and forms, have already been treated in a preceding Chapter , (Arts. 54, 55) and everything necessary has been explained and shown.(Fig. 75 et seq.).

71. Bay-windows and Balconies.

Bay-windows are easily built on houses, are wooden structures resting on corbels, whose appearance is shown in the street view in Fig. 15. Of the highest interest on the bay-windows are the already mentioned turned lattices previously represented, as well as the ornaments of cut boards on the cornices.

At the city gates and on fortresses, these are massively constructed of stone, and they form projecting structures resting on heavy stone corbels, with blind arches, slit-like windows, battlements and water-spouts.

The Gate of the Sun in Toledo, the Tower of Belem in Portugal, the Alcazar in Segovia, chiefly buildings in Spanish-arab style, are to be cited as examples. A characteristic example of a minaret balcony is given in Fig. 119.

72. Free Supports.

While the columns, piers, and other free supports are especially characteristic in all styles in their development of form, this cannot be said of the Arabian, at least during the first

century. There was found in Syria and Egypt too much available Egyptian, Grecian and Roman materials, and they disdained to give to the columns special forms in harmony with the other architecture. Thus most arcades of the mosques of all cities exhibit beside each other, shafts and capitals of columns of all forms and eras of preceding art periods (compare, for example, Figs. 55 and 56; a misunderstood Byzantine capital with masks and an Arab stalactite capital). Whatever novel was added, was frequently brought ready wrought from foreign countries (Carrara and the island of Marmora), or men were satisfied in their own country to change the antique Composite capitals in their details, only seeking special forms for the ornamentation of the mihrab.

73. Columns.

The triple division of the column into base, shaft and capital is not always retained; for the first is often wanting, (columns of the Mosque in Cordova), or stunted antique members were employed for them.

Peculiar, though not strictly beautiful forms are shown by the expanded, trumpet-like bases of the columns of the Alhambra (Fig. 121) and other specimens found in the Arab Museum at Cairo.(Figs. 124, 125).

When taken from antique buildings, the shafts have the refinements usual at that time, but they are otherwise formed as undiminished, slender members without entasis, whose ratio of diameter to height is in many cases 1 to 16 (including base and capital, thus far exceeding antique proportions.

Surfaces of the shafts are generally plain; yet the helical late Roman flutes remain in use (compare the external angle columns of the Mosque of Hassan in Cairo), and the vertical flutes with oblique changes likewise occur.(Fig. 126). Spirally twisted fluted columns are likewise to be found in buildings in Teheran (Persia).

Besides the already mentioned stalactite capitals, there are indeed the Alhambra capitals, which possess most strongly the characteristics of the style. As a basal form, the Byzantine impost-block capital [63] recurs in them, to which is added a slenderer extension with thick leaves. The grouped neck moul-

neck mouldings are also characteristic, recalling turned work in their forms, as well as an old Egyptian form of column. (Figs. 122, 123).

*Note 63. See Salzenberg, W. Altchristilche Baudenkmale Constantinopels vom 5 bis 12 Jarhhundert. Berlin. 1855.*

The capital everywhere accompanies the adoption of the strongly antique entablature mentioned, i.e., the Byzantine impost, which for slender columns makes possible a broader impost of the arch, or for this reason two columns are coupled together and one impost stone covers both (Fig. 121).

Entwined columns, like those shown by the period of the Cosmati and by Renaissance architecture, are also to be found, especially on the oratory of Omar in the Mosque El-Achsa and in the Mosque Gama-Abu-Ghalie-al-Sukari at the foot of the Citadel in Cairo.

74. Piers.

We find piers of square, rectangular, and octagonal section, supporting a horizontal entablature or as supports of arches. They are usually composed of base, shaft and capital, and Figs. 127, 128, give two examples of their forms (an Arab-egyptian and an Indian for comparison). Especially beautiful is the treatment of the rectangular pier with the small columns at the angles of the Mosque of Tulun in Cairo.(Fig. 1). Richly developed, with clearly expressed capital and ornamented surface of the shaft, are the square piers of the Great Mosque in Damascus.

Slender octagonal piers with high and heavy-headed stalactite capitals passing into the round form, the surfaces of the shafts adorned by Entwined lines and also with leaves painted in colors, are to be found in the palaces of Ispahan. In a mirror-pavilion there, the piers around a water basin rest on lions spouting water, recalling the columns of the portals of Italian Romanesque churches.

Disproportionately slender octagonal pillars stand on the Palace of Schar-Basch in Teheran, in the midst being a group of figures, whose separate forms are supported by lions spouting water.[64] Plain square and octagonal piers without any ornamentation were executed in the public Baths at Caschano,

whose base consists of a quarter round and capital is an abacus with a moulding.

*Note 64. See Coste, M. Monuments modernes de la Perse. etc. Paris. 1867. Plate 44.*

75. Arches.

The forms of arches over rows of columns or piers vary according to the country and the art period. The great variety that here prevails properly permits every form to appear characteristic. In general, what was said concerning arches over doors and windows is to be repeated here; but in spite of that, we will here give a complete and comprehensive description of the different developments.

1. The arch is constructed of smooth natural stone or bricks, alternating in colors or covered by a stucco surface, -- the oldest and simplest method.

2. The face of the arch exhibits actual artistic jointing, or imitative in marble veneering.

3. The simple arch is enclosed by a framing member (band and cove), or this member follows with certain changes the antique tradition of the archivolt section.

4. The arch receives a complete Gothic-like roll and hollow section, as on the trefoil arches of the mihrab of Zacharias in the Mosque El-achsa.

5. The arch is bordered by a bold cavetto, which is covered with colored faience, as on the ogee arches of the Mosque in Ispahan.

6. The face of the arch is bordered by a band, and the surface of this band is decorated by entwined ornaments or inscriptions (Gateway Allah-ud-Din at Delhi), recalling the Syrian=Roman treatment of the decoration of the Archivolt.

7. The face of the arch is cowered by zigzag ornaments, as on many western mediaeval works.

8. Instead of the plain line of the arch, the foiled outline is chosen, and the foiled arch is introduced for round and pointed arches.

9. The external surfaces of the voussoirs are decorated by relief ornaments.

10. The ornamented voussoirs are cut into the arched form on the outer edge, thus giving to the arch a fan-like appearance.

11. Entwined arches (partly transverse arches, partly fanciful eccentricities) occur in place of simple arches; the uppermost arch then generally has a greater depth of soffit than the lower one, which is made possible by setting half columns on the abacus of the capital of the lower column. (Figs. 5, 41).

12. Projecting arches, which rest upon sidewise projecting corbels above the abacus of the capital or on small pillars, (Fig. 201); arches of the Court of Lions of the Alhambra; also see Figs. 5, 6, 7, as well as Fig. 121.

13. Stalactite arches, where the stalactites may be arranged radially on the archivolt or hung from the arch like drops and determine its form. (See Fig. 201; Court of Lions of the Alhambra).

The arches introduced in its works by Arab art are almost always stilted, this custom arising in principle from the need of higher openings for light and air in the frequently deep Liwans of the mosques, than was possible with the ancient round arches and the relatively short shafts of the columns taken from antique monuments. It was not much, in seeking original forms in place of the earlier employed stilted round arch, to introduce the horseshoe and pointed arches, previously used in certain cases. We merely refer to the horseshoe arches in the Indian rock-cut temples of Carli[65], in the Christian monuments of Urgub and Dana (see Figs. 2, 3, 4), and the pointed arches in Chaldean and Assyrian buildings. The ogee arch is a combination of the horseshoe and pointed arches, and it occurs in the same form, executed by corbelling out stones, already in various tombs of ancient Egypt and on a tomb of the necropolis of Mugheir in Chaldea. The gable-like inclined spanning of openings by straight bands, which was to become characteristic of Arab architecture, was already found on the niches of the Theatre of Taormina.[66]

*Note 65. See Schlagintweit, E. Indien in Wort und Bild. Leipzig. 1880-1881. Vol. 1. p. 67.*

*Note 66. See Part II. Vol. 2. p. 152, of this Handbook.*

Ogee and horseshoe arches were therefore already favorite forms for Arab architecture, since they permitted the interruption of the too high stilted arches at their transition into the vertical supports by means of a corbel or projection. (Fig. 132).

One of the oldest pointed arches in Arab art must indeed be that on the western part of the southern wall of the Mosque of Amrou at Old Cairo (Fig. 186). Without change to the ogee arch, this passes directly into the vertical of the supports (Fig. 28), in contrast with the pointed arch forms of the Mosque of Tulun. (Figs. 1, 76).

76. Domes.

Likewise the forms of domes have not remained the same everywhere. While in Spain the spherical and round-horseshoe form was most commonly preferred, the ogee form is chosen in Syria and Persia, in Egypt the merely stilted pointed form,,in which the egg-shaped form of the Sassanian domes was scarcely imitated. (Figs. 129 to 185).

According to statements in the last Chapter (Art. 43), the outer surface of the dome is either plain and not painted, or is grooved, or it is decorated in the richest manner by carved or painted scroll ornaments (compare the colored representation of the dome of the Mosque in Ispahan in Coste. (Plates 22, 23).

Arab art formed the contours of its domes in accordance with the forms of arches, but these generally occur much later, in Egypt only in the period of the Fatimides.

While the forms of domes on the north coast of Africa and those of the Arab-osmanic period all exhibit a Byzantine character, the domes built in Egypt and Syria mostly outgrew these special forms entirely and preferably appear as stilted pointed arched domes; but those in Persia and India on the contrary exhibit the so-called bulbous form. The stilted pointed arched dome already occurs in the so-called Temple of Diana at Baiae and in a central building of Ezra in Syria. That it relatively occurs very late in Egypt and Syria is perhaps for the reason, that from the beginning, the court plan with wooden ceilings was adopted for the mosques, and that domes were reserved for covering mausoleums. Since according to the laws of the Koran, no one could be buried in the mosque itself, the domes were omitted on it. The first small domes over the space before the kiblah appear to have originated under Persian influences. From the earliest times, Persia employed domes and vaults for covering its buildings.

What Arab art accomplished in the erection of mausoleums is

finely evidenced by the splendid monuments of Egypt and of India, by the artistic forms in the former, and by the magnificence of execution and of materials in the latter. But the the peculiar form of its domes in Egypt are to be noted.

The Arab mausoleum consists of a cubical room, crowned externally by Arab battlements, above which is built between it and the drum of the dome the transition so peculiar to Arab art. (Fig. 37). This raises the dome proper and makes it more visible. We have to do here with an entirely novel type. The transition from the square to the cylindrical or polygonal drum is developed from the four angles of the cube, either as inclined planes with projections of crystalline form, or in stepped offsets, or in rolls and hollows with or without surface decorations (Figs. 140 to 144). The outer surface of the dome was then usually covered by rolls (Fig. 38), or by rich ornamented interlacing forms (Fig. 37), whose ornamental divisions generally relate to those of stalactite pendentives in the interior.

The crowning ornaments of the domes are mostly made of wrought copper, spheres, rings, crescents, and lilies being arranged on a vertical rod, a collection of examples of these being given in Figs. 145 a to g.

77. Decoration of Ceilings and Walls.

The ornamentation of the ceilings and walls of the interiors forms a favorite problem of Mohammedan architects, the enjoyment of color and the imagination of the master could have freer course here, although he was generally compelled to dispense with the most effective elements of decoration, the human form, the forms of animals, and the fanciful combination of these with plant forms, since their use was forbidden to them by religious command.

Within these limits, Arab artists accomplished the highest attainable results, and the fullest acknowledgement cannot be denied to them in this domain.

If with the almost unbroken surfaces of the walls, with the lack of a strong architectural composition or subdivision of them, and with the great colored surfaces, we always recall tents ornamented by brightly colored fabrics, then by the aid of marble veneering, faience and wooden wainscoting, mosaic

ornaments, stucco, painting and gilding,[68] with scroll ornaments and the interlacing of the geometrical figures and lines, a truly marvelous magnificence of adornment is produced, — which certainly has a more bewildering and dreamy effect, disposing one to reflection, rather than produce an animated effect, like the rich figure decorations of antique and Renaissance art, which arouse social sympathy, enjoyment, and traffic. We refer to the patterns of colored mosaics on page 1 and give in the two succeeding colored Plates two examples of the ornamentation of ceilings. One exhibits a rich and gilded decoration from a ceiling of the old Mosque at Cordova, and the other is the small, flat and simply painted wooden ceiling in the vestibule of the Medresseh El-Aini[69] on the street El-Dawadari at Cairo. The latter example is also further interesting, because it gives the coat of arms[70] of the builder of this medresseh.

*Note 68. To enhance its effect, the gilding of the Arab period was almost always executed on raised surfaces. If this form was not originally foreseen in the sculpture, then before the ornamentation was formed a low relief with plam fibres and stucco on the portions to be gilded.*

*Note 69. Aini was the architect of Sultan Muayyed.*

*Note 70. Such coats of arms were earlier common among Arab rulers and emirs, as for Christian knights. We usually meet with them in medallion form, mostly divided in three horizontal spaces, on walls of portals and on ceilings of mosques, palaces and other public buildings, cut on stone, carved in wood, in mosaic, or merely painted. The heraldic symbols of the different spaces represent cups, keys, balls, cornucopias, palm-leaves, and the like, also sometimes animals, as for example, the lion of Bibars, and frequently hieroglyphic forms, taken from ancient Egyptian temples.*

*Moreover, the coats of arms also occur on the different articles of furniture of mosques and houses, even being chiseled on objects of iron and copper, carved or in mosaic on furniture of wood or ivory).*

78. Furniture of the Rooms.

Just as the better rooms of the antique house were not intended, — and their decorations were designed accordingly, — to receive many articles of furniture, the portable equipment of chests and coffers, tables, chairs and sofas, bookcases, etc.,

of our own time, neither were the Arab state apartments. Persons were then ~~either~~ satisfied with a little furniture. In the central part of the Dunkah, the gathering place of the female slaves, there was usually opposite the entrance doorway a table (zsussa) of marble or stone, usually richly ornamented, to hold vessels during the entertainment of guests, who occupied the divans of the liwan. There along the wall were built masonry divans, covered by fabrics, rugs or mattresses, above which cupboards were let into the wainscoting and the walls. These were 6.5 to 9.8 ft. high and were crowned by cornices for the reception of knicknacks in ivory, metal, porcelain, crystal, etc.; beneath them were also imitations of animal forms in bronze and crystal from Asiatic countries. The furniture only consisted of kurses, usually small hexagonal or octagonal tables of wood or bronze, mostly richly ornamented by marquetry, chasing, and inlaid work, on which were also set the great platters (sanija) of metal, around which the partakers of the meal gathered on cushions or merely on the rug.(Figs. 146, 147).[71, 72]

*Note 71. Frog Zeits. für Bild. Kunst. 1886. p. 196.*

*Note 72. Reproduced from Le Bon.*

Likewise to be mentioned is the lighting apparatus, as follows, of brass or bronze. The great candelabrum (tanur, Fig. 157) and the little chandelier (tsoriah, Fig. 158) from the Arab Museum[73], the fanus (Fig. 159), which also occurs in the form of a portable lantern, then the charcoal brazier(mangal) of copper, frequently richly ornamented, for warming the rooms, also sometimes a chest to contain objects in wood was covered with sculptures and marquetry, or even by chased metal plates or stamped leather. On the walls were frequently faience articles, inscriptions written as ornaments, and suspended fabrics. Under Persian influences, there were in Egypt portraits or oth- pictures hung up. In the Alhambra are found on a ceiling genre pictures painted on leather.

*Note 73. See Herz. M. Illustrated Catalogue of the Arab Museum. Cairo. 1895.*

The exhibition of statues and the hanging of pictures on the walls, a mode of decoration at least to some extent found in the homes of classic antiquity, and which makes the dwellings of the modern period so attractive, was generally forbidden to

the orientals, — forbidden on religious grounds, and a great part of our portable furniture was also omitted by reason of climatic conditions, which required another mode of life, of living, and of furnishing.

# Chapter 5. Buildings.

## a. Buildings for Divine Service. (Religious Buildings).

### 79. Mosques and other Rooms for Prayer.

The mosques are not buildings in which the Deity is conceived to be present or to dwell, but are a place for prayer and of assembly of the faithful, who there call upon the one God in prayer.

A divine service with ceremonial and pomp, such as the Christian religion exhibits, is foreign to the Mohammedan. The ritual is the simplest conceivable' one great religious festival in the year, ablutions, and prayer five times daily.

The form of the mosque is prescribed by no law; it is erected both as an uncovered space (hypaethral) and as one covered by a roof.

The strict requirement is, that in the wall surface before which prayers are offered, a niche[74] shall be formed, whose axis indicates to the faithful the true direction towards Mecca. (Figs. 148 to 150). Yet the earliest form of plan, that of a court with a basin for ablutions, has been retained until this time. It is indeed more ancient than Islam itself.

According to the statements of ancient Arab writers, the buildings of the earliest periods were of the simplest kind of construction. Only later and indeed when the Mohammedans soon after the origin of the new religion came into contact with cultured races, did these simple designs become rich mosque courts, where marble columns replaced the former supports composed of date palm trunks. The plan of the rectangular court design (Figs. 166, 167) was then first and only in the interior changed by symmetrical enclosures in the four angles, so that the original room for prayer was also used for instruction, and the mosque was transformed into the medresseh (high school). By these added structures, the plan of the hall for teaching and prayer of the medresseh assumed a cross form. (Fig. 168)[75]

*Note 74. The first of these prayer niches, mihrab or kiblah, was built in the Mosque at Medina during the lifetime of Mahomet, the prophet.*

*Note 75. Compare Neumann. W. A. Die Grund-Idee des Moscheenbaues, etc. Zeits. der Oest. Ing. und Arch. Verein. 1882. p. 85. Franz Pasha. Studie über Namen und Entstehung der Kunst der*

*Völker des Islam. Oest. Monats. für den Orient. June, July. 1894.*

This plan is indeed scarcely followed by the mosques of the Arab-Osmanic period, which incline to the forms of the Byzantine central building.(Fig. 172.).

In Arab architecture, we have to do with three chief groups of plans of houses of prayer, into which many hundreds of designs may be classified.

The first kind, the arrangement of an uncovered court with isolated supports of the roof exhibits three varieties in form, whether columns or pilasters are used, or both together, in the mode of covering, whether by wood construction or by vaults, and in the form of design of the portal. Many of the Indian court plans are distinguished by external and detached great portal structures, which sometimes intersect by their vestibules the pilaster arcades of the three porticos and extend even to the sahn-el-gama.

The second kind, those with a cross-shaped plan of the hall of prayer, is that employed for the medressehs. The forms vary in the depth of porticos, in the mode of covering these and the sahn-el-gama, as well as in the location of the adjoining mausoleums and of the enclosed rooms for the administration of the medresseh, for the sebil with the kuttab, for the dwellings of the students, and for the rooms for the care of the dead. The four arms of the cross are employed as class rooms for the pupils of the four rites of Islam. Therefore the two side halls generally have special mihrabs, since the chief kiblah cannot be seen from them.

In the second Mameluke dynasty, a change of this form of plan was especially common, indeed for designs of medium and small dimensions, in which the two side arms of the cross were very much shortened. Doors, corridors and closets opened into them; even in one of the wings, as for example, in the Mosque El-Esbek at Cairo (Fig. 174), the cenotaph of the founder was erected. The sahn-el-gama was covered by a horizontal wooden ceiling with a lantern. Columns were but seldom employed here, as in the Medresseh of Barkook, in the Nahassin quarter of Cairo.(Fig. 170).

We sometimes find a combination of the two types of plan, for example, in the Tomb-Mosque of Barkook, from the end of the 14 th

century A.D..(Figs. 178, 179). Instead of massive tunnel vaults spanning the liwans, we find here domical vaults resting on free supports and covering the arms of the cross. In Persian mosques and medressehs, the liwans are generally vaulted by domes.

As for the mosques of the third period, whose chief types occur in Constantinople and the adjacent Ottoman provinces, especially in Adrianople and from the 16 th century in Egypt and Yemen as well, in imitating Byzantine models, the Mohammedan artists principally endeavored to reduce the sections of the free supports of the domes as much as possible, in order to obtain from all sides a freer view of the kiblah, and they preferred to arrange more points of support than in S. Sophia, as in Mosque Suleimanie at Adrianople and in the Meleke Sophia at Cairo. The transmission of the weight of the dome to the columns set in a square was thereby simplified, and the construction of the pendentives was made certain.

In the Mosque of Sinan-Pacha at Boulak near Cairo (Figs. 172, 173), from 1571 A.D., the dome is strengthened at its base by piers and rests directly on the outer walls, around which broad arcades adjoin on three sides; these arcades are generally utilized as mosallah.

Mosques are generally designated in Arabic by Gam'a (gathering) and Musjid (bowing). Originally on Fridays and only in the Gam'a was the Koran read, the passages for the Caliph spoken, and government announcements were made; this restriction no longer exists. The Gam'a is usually distinguished from the Musjid by its greater dimensions, by historical and political reminiscences, and usually by a monumental treatment.[76]

*Note 76. Mosques can now be opened only by permission of the ruler of the country and scarcely differ from each other in form or ritually.*

According to their religious importance, the mosques fall into two classes; 1., those in which prayer may be offered on each day of the week, termed gam'a (these are the principal mosques), and 2, those in which men may pray only on week days with the exception of Fradays, -- called mesjid (these are the ordinary mosques).

In addition to these two chief kinds of mosques are the Sam-

Samjahs (angles) like our chapels. these are smaller fooms för prayer with a mihrab, but mostly without a mimbar, and freounetly built in a private house.

Every enclosed area having the indication of the direction of Mecca, whether within a building or under the open sky, is termed Mosallah; it may only be visited after the completion of the ritual ablutions, and it serves the faithful for the performance of their devotions, where no mosoue or samjah exists, or at hours when these are closed.

Likewise at the latticed windows of the mausoleums of the saints (sheik or weli) does the Mohammedan offer his prayers.

80. The Gam'a.

The gam'a contains a large court (sahn-el-gam'a), generally uncovered, at the middle of which is freouently found the fountain for the religious ablutions (hanefiye) or a basin (medah).

At the side turned towards Mecca adjoins the chief liwan, the sanctuary, in which the religious furniture is placed. Between this and the court is usually a lattice of turned work, which separates the holy place of the gam'a from the court. The sanctuary is covered by rugs or mats (hafire).

At the side of the sahn-el-gam'a is also found a smaller court with a basin of water at the centre and the necessary privies along the enclosing walls. This court is generally visited before entering the hall of prayer.

Next the sanctuary stands the mausoleum of the founder of the mosoue, termed maksura, and at a greater distance from the principal entrance is the sebil (fountain) with the kuttab (elementary school), and a loggia above it.

To these parts are then added the minarets and the dwellings of the mosoue.

81. The Liwan.

In the arrangement of the objects in the sanctuary (principal liwan', we distinguish between the following:--

1. The prayer niche, mihrab or kiblah, that architectural part of the mosque, most richly ornamented, where taste and richness compete in its execution. We see there niches in perfectly beautiful and monumental execution in Mosoue Muayyed (Fig. 158) and in the Mesjid Tabassed in Cairo (Fig. 151) in simpler materials, yet beautifully and artistically treated

in the Tomb-Mosque of Sitte-Kokaiah in Cairo.(Figs. 152 to 154)[78]. But beside the chief prayer niche, we also find, as decorations or for individual prayer (yet always placed at the wall toward Mecca) other and simpler prayer niches (pseudo-mihrabs), as shown by the ground plan in Fig. 149, in which the different typical form of the mihrab is also given.

*Note 77. A part of the Mosque Azhar at Cairo, built by Allah-ed-pin Tebars-el-Khasnadari in 1309 A.D.*

*Note 78. Now in the Arab Museum at Cairo.*

2. The pulpit,-- mimbar,-- which is hung with decorations of standards and fabrics during great festivals. Originally a seat with a few steps, the mimbar later received a high position covered by a small dome, many steps led up to it and their entrance could be closed by a door, as shown by one of the richest examples, the mimbar of the Mosque of Sultan Muayyed in Cairo.(Fig. 156). Equal art and richness, as for the mihrab, was bestowed upon this second article of furniture, which then stood at the right of the former and was placed before the observer.

3. The desk, -- kursi (suret-el-kah), -- on which the Koran was laid during divine service, and which was otherwise kept in a special case.

4. The Dikkeh, a platform set on columns and surrounded by a low grille, from which the assistants of the chatib, the mo-mell'ain, repeated the words of the Koran to people standing at a distance. The Koran was read on the mihrab.

5. The lighting apparatus of the mosques comprises the tanur (Fig. 157)[82], the tsoraih (Fig. 158[79]), the fanus, a chandelier (Fig. 159[82]), a lantern, the kandil, an oil lamp, and the schamartin, a candlestick for wax candles. To these are added as a decorative element a kind of vase, partly in enameled glass, partly in carved and repoussee copper.(Fig. 106). The chief means of lighting is the little oil lamp (kandil), similar to our old night lights. In its most primitive form, fixed in a wire ring, it is suspended by three chains or wires from a hook in the ceiling or from the ties of the arcades of the mosque.(See Art. 49 and Fig. 156). A group of kandils, fastened together and placed in the bottom of a lantern forms the fanus. If they are arranged on a wire or brass support,

usually in several rows; this produces the Tanur and the Tsor-aiah. These are frequently made of great dimensions; the tanur then has a pedestal (Fig. 157[81]) to place it on the ground for convenient cleaning.

*Note 79. Reproduction from Ebers' Egypt.*

*Note 80. This word signifies the front of the Pleiades.*

*Note 81. From Zeits. für Bild. Kunst. 1886.*

*Note 82. Reproduction from Le Bon.*

82. Main Portal.

The entrance to the mosque is through the main portal, which generally forms a rectangular niche recessed in the facade and extending the entire height of the building.

The niche has the entrance doorway in its rear wall, and it is covered by a tunnel, star, stalactite, or other vault, and it usually contains stone benches on the right and left of the doorway (fig. 101). Before or behind these benches is a low enclosure by a wooden lattice or marble slabs, before passing which the shoes are to be removed.

As a rule, the niche is spanned by a trefoil arch. Through the mosque doorway in the rear wall of the portal, one enters a square vaulted vestibule and from thence passes through a corridor into the sahn-el-gama. The latter is paved with stone or brightly colored marble mosaics, and it is also sometimes planted with palms or other trees, is 8 to 16 inches lower than the liwan, which usually has a special mihrab, when not on the axis of the kiblah. Since the liwan is usually covered by mats or rugs, a costly pavement is there rarer.

83. Court.

The court of ritual ablutions is of rectangular form, furnished with hanefiye or medeh at its centre, a number of privies along its walls with one or more bath rooms for the poor.

The former, the hanefiye, required for the sect of the Hanefites, is a closed basin, fitted on its exterior with brass stopcocks, before which the faithful sit on stone cubes, in order to cleanse their faces, hands and feet, before prayer. Around it, as well as around the medeh, extends a channel in the floor to receive the water after use in washing. On the contrary, the medeh is an open, shallow basin from 1.31 to 2.62 ft. in depth, around which the faithful squat during their ablutions,

usually in several rows; this produces the Tanur and the Tsoraiah. These are frequently made of great dimensions; the tanur then has a pedestal (Fig. 157[81]) to place it on the ground for convenient cleaning.

*Note 79. Reproduction from Ebers' Egypt.*

*Note 80. This word signifies the front of the Pleiades.*

*Note 81. From Zeits. für Bild. Kunst. 1886.*

*Note 82. Reproduction from Le Bon.*

82. Main Portal.

The entrance to the mosque is through the main portal, which generally forms a rectangular niche recessed in the facade and extending the entire height of the building.

The niche has the entrance doorway in its rear wall, and it is covered by a tunnel, star, stalactite, or other vault, and it usually contains stone benches on the right and left of the doorway (fig. 101). Before or behind these benches is a low enclosure by a wooden lattice or marble slabs, before passing which the shoes are to be removed.

As a rule, the niche is spanned by a trefoil arch. Through the mosque doorway in the rear wall of the portal, one enters a square vaulted vestibule and from thence passes through a corridor into the sahn-el-gama. The latter is paved with stone or brightly colored marble mosaics, and it is also sometimes planted with palms or other trees, is 8 to 16 inches lower than the liwan, which usually has a special mihrab, when not on the axis of the kiblah. Since the liwan is usually covered by mats or rugs, a costly pavement is there rarer.

83. Court.

The court of ritual ablutions is of rectangular form, furnished with hanefiye or medeh at its centre, a number of privies along its walls with one or more bath rooms for the poor.

The former, the hanefiye, required for the sect of the Hanefites, is a closed basin, fitted on its exterior with brass stopcocks, before which the faithful sit on stone cubes, in order to cleanse their faces, hands and feet, before prayer. Around it, as well as around the medeh, extends a channel in the floor to receive the water after use in washing. On the contrary, the medeh is an open, shallow basin from 1.31 to 2.62 ft. in depth, around which the faithful squat during their ablutions.

Over either rises a flat roof or a dome supported by columns or piers, frequently treated artistically, which those wearing from rain and sun, as well as the basin itself from pollution by dust or birds, so far as possible.(Compare in Fig. 127 the section through the medeh of the Mosque of Ashar, which was built by Kaitbey, and Fig. 171).

84. Privies.

The privy is about 4.10 ft.wide and up to 6.56 ft. long, and it has on the left the small entrance door, on the right the step 0.65 to 0.98 ft. high for crouching, with an opening about 0.49 ft. wide and 1.64 to 2.62 ft. long; on the right of the step, water runs in an open channel in the masonry.

The sewers are 1.98 to 3.28 ft. wide and 4.91 to 9.82 ft. high, but they are without a bottom of masonry, so that the leakage of fluid sewage exerts an extremely injurious effect on the health conditions of cities.

The privy drains for the upper stories consist of square masonry sewers 1.64 ft. square inside.

When flowing water is not at hand, then a well exists in or near the court, from which water is obtained by means of a chain of buckets or a sakiye.

85. Maksuras.

Between the sahn and the sanctuary usually stands a more or less richly carved lattice of wood, by which the sanctuary becomes the maksura. Under this name is included in addition to the given signification also the cells, which different caliphs had built in or adjoining the sanctuary for their personal security, since it occurred that attempts were made on them during prayer.

86. Minarets.

Although we posses no definite data concerning the time of the introduction of minarets and relating to their original form, yet we may conclude from the oldest examples remaining, that they were of square plan with low and wide elevations, and that the gallery for the muezzin was originally produced by recessing the walls of the upper story (Minaret Sidi-Okba in Cairwan), while later, with much slenderer proportions of the whole, this was formed by strongly projecting cornices supported by stalactite forms.(Fig. 53).

The ancient squat minarets with square substructures and openings in their upper stories, through which during prevailing epidemics and during the prayers on **Fridays**, smoke poured in great abundance, received the name of mabcharah. If the mosque had no minaret, the call to prayer was given from the terrace or from a bay-window, usually built for this purpose above the portal.

On the oldest minarets, the uppermost story with the openings was covered by a dome, that recalls the Tartar cap, while the later ones, commenced by Sultan Hassan, this superstructure consisted of marble columns, which supported a stalactite cornice, from which rose a knob like the Egyptian vase for water 88 which was crowned by the crescent.

*Note 88. Its form belongs to the time of the Pharaohs.*

The minarets built under Osmanic rule are covered by a conical roof. (See section of Mosque Sinan Pacha in Fig. 173.).

The stairs sometimes extend around the minaret as an external flight of steps, for exampl, at Ahmed-ibn-Tulun (Fig. 12), or they are carried in the interior if the massive structure around a solid masonry newell. With slenderer proportions of the tower, the substructure was later executed in solid masonry up to the terrace of the mosque, with sometimes the portal of the mosque within the minaret, or a small room formed at the level of the street. The special staircase to the minaret was then placed at another point of the plan, and only for the upper stories was it then continued from the terrace to the minaret. Spiral staircases are usually employed, sometimes with two flights around the same newell, as for example, in the Ghuri minaret of the Mosque Ashar and in that of Mosque Esbek at Cairo; yet in larger designs inclined tunnel vaults likewise occur, on which rest the steps, which have a length of 2.30 to 3.60 ft.

The gallery lattices are partly constructed of perforated slabs of stone 3 to 4 inches in thickness, partly of wood.

Besides the examples shown in Figs. 12 to 14, the other kinds of forms of lattices (Figs. 161 to 164) complete the representation of these peculiar architectural parts.

. 87. Dwellings in Mosques.

It is only to be said of the dwellings in mosques, that ex-

excepting perhaps the mandarah, their treatment is tolerably simple and plain, since they were only intended for the use of subordinate officials, simple students and pilgrims.

Stalls constructed in the simplest manner served for sheltering the animals required for providing the water required for ablutions, and for the riding animals of the mosque officials and of pilgrims.

## 88. Typical Forms of Mosques and Exteriors.

By their ground plans, we have determined three chief groups of mosques.(See Art. 79).

1. To the first group belong most Arab mosques, for which the rectangular form of plan with arcades of columns and piers around an open court remains typical.

On the side toward Mecca, the arcades in several similar rows are of equal height, while the three other sides usually have only double rows.

Examples of this ancient design are preserved in the Mosques of Amr-ibn-el-As and Ahmed-ibn-Tulun in Cairo, whose plans are given in Figs. 166 and 167.(Also see Fig. 169).

The inscribed numbers on these plans and on the following plans indicate the uses of the rooms, as follows:--

1. Portal.
2. Vestibule.
3. Corridor.
4. Court (sahn-el-gama).
5. Liwan of the hall of prayer.
5', Sanctuary, i.e., hall of prayer toward Mecca; (chief Liwan.
6. Mausoleum.
7. Sebil with kuttab (elementary school).
8. Hod (drinking place).
9.) Reception and living rooms of the mosque offici-
10.) als and cells for pupils and pilgrims.
11.) Medeh and Hanefiye.
12.)
13. Dikkeh.
14. Mihrab (kiblah).
15. Mimbar.
16. Open reception hall.(Seldom occurs, for example, (Barkook).

17. Minaret.

18. Room of the Imam.

2. Of the second group, those with a cross-shaped plan of the hall of prayer, with open court and vaulted liwans, the plans of the Mosque of Sultan Hassan (Fig. 168) and of the Medresseh of Sultan Barkook (Fig. 170) give beautiful examples. Of these, the Mosque of Hassan with the added name of the "Splendid" is indeed the most pleasing solution and that one of the mosques of Egypt most effective in its simplicity,-- perhaps the most important monument of Arab architecture. It was commenced 1356 A.D. and completed 1359 A.D. by Malik-en-Nasir Abu'l-Maali-Hasan-ibn-Kala'un, who is said to have had the hands of the architect cut off after the completion of his work (according to tradition), so that he could never erect a second equally beautiful building.

Unique in its way is the effect of the entrance portal 65.6 ft. high, and of the majestic lofty wall with the shallow recesses, which show 6 to 7 rows of windows above each other. Notable are likewise the southern minaret and the maksura (room no- 6 of the plan), with the Tomb of Sultan Hassan, above which swells the dome, 180 ft. high, that was rebuilt after its fall in the Arab-Osmanic period, whose substructure is so beautiful externally, especially in the details of the charming design, with the twisted columns inserted in the angles and the massive stalactite cornice previously described, and represented in Fig. 98.

Surprising is the effect of the open court measuring 115 by 105 ft., into which open by lofty pointed arches the vaulted arms of the cross, and in its midst stand the two fountains for the ablutions of the Egyptians (medeh) and of the Turks (hanefiye), of which Fig. 171[85] gives a view, though indeed one of decay. According to traditions and to the little facades of buildings like churches sculptured in low relief, which occur on a little pier on the right side of the main portal, the monument must have been built by a christian, and from the style of the building as shown, one must first think of a Syrian Christian as the architect.

*Note 85. Reproduction from Le Bon.*

3. A simple example of the third group, whose buildings are

characterized by having completely vaulted halls of prayer in imitation of Byzantine domed churches and especially of the Church S. Sophia in Constantinople, is afforded by the Mosque Sinan-Pacha in Boulak near Cairo, with a great central dome, corridors extending around it on three sides, and a slender pointed minaret.(Figs. 172, 173).

The Alabaster Mosque, completed only in 1857 (Gam'a Mohammed Ali) and in the Citadel of Cairo, is of a more perfected design, like the Mosque of Mahmud II in Constantinople; the dome is 66.5 ft. in diameter and rests on four semicircular arches borne by four massive piers, their openings closed externally by spherical half domes, while four small domes fill the square spaces between the piers and the angles of the enclosing walls. On the side in which the main entrance is found, there adjoins an open court measuring 128 by 91 ft. with a hanefiye and with vaulted porticos extending around it. This mosque was built after the model of the Nur Osmanli at Constantinople by the Greek Jusu of Boschnah.

89. Tomb-Mosques.

As the medresseh appears as a mosque in its external forms, though it was originally intended as a school, so does the tomb-mosque, which is a memorial building. The sole difference is, that the hall of prayer becomes of less importance in comparison with the mausoleum, the dwellings, and the charitable arrangements. The typical plans can be subdivided into three given classes. The most important of those existing in Egypt in ruins and of unusually regular architectural form is that of Barkook in the desert on the east of Cairo (Fig. 1785 179). On the southeast and southwest stand the mausoleums of the male and female members of the family, on the northwest being the sebil with the kuttab, and on the southwest are living rooms. On the western facade are two notable minarets, whose upper stories are destroyed, in that on the north being arranged rooms for pilgrims and scholars, opposite being living rooms, and quite on the south is the court for ablutions.

The liwans are vaulted, the domes of brick masonry rest on piers of ashlars. The entire structure is executed in nummulitic limestone, but it now exists in a very ruinous condition. The preparation and use of the mud mortar was carried on with

the greatest carelessness, which is the chief reason for the present lamentable condition of this magnificent monument. Ma- portions have already fallen, as for example, the cells behind the north liwan and parts of the arcades, of the south and west liwans, and of the upper stories of the minarets, etc. Very remarkable is the mimbar of sculptured stone placed in the sanctuary by Kaitbey.

One of the largest designs of this kind in Egypt is the partly ruined Tomb-Mosque of Sultan Malek-el-Aschaf-Inal (Fig. 177), built 1456 A.D., the northernmost of the necropolis of the so=called Tombs of the Caliphs at Cairo, whose minaret contends with those of Kaitbey for supremacy in elegance, richness of ornamentation, and in harmonious proportions. On the south was built the Tomb-Mosque of the Emir Kebir only about half a century later. Both monuments served for many years as powder magazines, and during that period, they almost entirely lost their rich decoration by marble mosaics.

The purposes of the rooms grouped around the courts for the officials, strangers, pilgrims, and servants, as well as those for animals and for stores is not entirely clear, since much of these portions of the building lie in ruins.

We have here to consider another kind of memorial buildings, which indeed contained no extended arrangement for a mosque. The hall of prayer, in which continual prayers were uttered, is limited to one or more halls, but these, especially in India, form magnificent monuments of costly materials, as for example, the Taj near Agra, the Mausoleum of the emperor Akbar at Secundra near Agra (Fig. 21), the Tomb of Sultan Tughlak=Shah near Delhi (Fig. 22), and they far surpass the limits of ordinary memorial buildings. As an example of a prominent princely mausoleum in Cairo, which is also notable structurally, we give in Figs. 175 and 176 that of Umm-es-Sultan, located at the foot of the Citadel and belonging to the so-called Tombs of the Mamelukes; it consists of a square hall of prayer covered by a pointed tunnel vault, whose front side is open, and which has a mausoleum on each side. Remarkable is the extremely rare construction of the domes, comprising both external and internal shells.

b. Mausoleums; Tombs of Families and Individuals.

90. Tombs of Sheik's.

As the buildings hertofore treated were entirely or chiefly consecrated to divine Service, the following owe their origin to the veneration of the dead.

The monarch or the founder of the mosque placed his tomb in a separate room of the mosque, usually connected with the hall of prayer by a doorway. According to the position and wealth of the founder, it was larger or smaller, magnificently or less richly constructed. The ordinary mortal, as always in this world, had to content himself with a simpler memorial of his former existence.

For a venerated sheik or a saint, an isolated mausoleum was built on the spot where he ended his existence, -- a so-called sheik's tomb, a representation of which is given by the Tomb of Sheik Ru'ey at cairo, Figs. 182 to 184. Such tombs are usually to be found beside lonely roads or canals, and their design and decoration yet exceed the ordinary limits. Fig. 181 gives the Tomb of Sheik Manaui at cairo, which shows a similar plan, but contains some further accessories in the arrangement of walls and courts, like the vestibule on the right of the mausoleum, which serves for the recital of the prayers for the dead.

91. Famaly Tombs.

The burial place of a wealthy family is called"Hosch (court), and it consists of a larger or smaller area enclosed by a wall with battlements, within which stands the mausoleum of the family. In surrounding courts or gardens rest the slaves of the house. on a selected spot is a dwelling for women, who come on certain festival days to pray at the tombs and feed the poor, and on another is a sebil, with sometimes stables also.

92. Canopy Tombs.

Of picturesque effect are the canopy tombs, common for a few centuries past, where four marble columns or stone piers rise on a stylobate and support a stone dome, beneath which is placed the marble cenotaph.

93. Tombs of the Modern Period, etc.

The tomb of the modern period, erected for both poor and rich in the same style, consists of the crypt proper, above this be-

being placed an empty sarcophagus, the tarkibeh; the differece between the two only consisting in the use of richer materials and more costly workmanship. The tombs of those less wealthy are built of plain masonry and are adorned at the front by a simple pillar or column, the so-called Schahid, shown in Figs. 185, 186, while Fig. 187 represents the richly ornamented marble cenotaph of Emir Serghatmasch in the Medresseh of the same name at the base of the Mosque of Tulun in Cairo.

The cenotaphs of the great in the best period of Arab art were simple in their general form and their proportions, but rich in the finely colored material employed.

Many sepulchral monuments, like that of the Abbassides beside the Mosque Sitte-Nefisa, are crowned by richly carved woodwork, while the base gleamed with costly marble mosaics.

These cenotaphs degenerated in the Osmanic period to colossal Barocco structures overloaded with inscriptions, gilding, and ornaments without character.

The interior of the cenotaph was usually spread on certain days with flowers and fragrant spices, while the vaulted crypt beneath received the dead.

The vault must be sufficiently high for the dead person to comfortably stand erect on the night after his death, when the angels Munkar and Nekir made an examination of his deeds on earth. The corpse was simply wrapped in linen, was laid on sand with the face toward Mecca; only in the graves of the masses could corpses be placed in layers above each other. Men and women were usually placed in separate vaults, but in a common sepulchre, they must be separated by walls. -- The modern family tomb shown in Fig. 188 in plan and section has its entrance at A and on the right and left are the burial places for men and women. Sunken holes a and projecting stones b aid in lowering the corpse. After the burial of a member of the family, the entrance is closed by monoliths c and earth or sand is spread over them. For princely mausoleums, steps lead down into the crypt, whose entrance at the level of the mosaic pavement is closed by marble slabs.

To protect the corpse from dampness and infiltrated water, the cemeteries are located on hills, preferably in desert

tracts, where such exist.

These form true cities of the deadin the vicinity of the great centres of population, and they differ in external appearance from the dwellings of the living only by a larger number of domes and by a rather smaller concourse of men in the streets.

c. Tekiye, Sebil, Medresseh, and Moristan.

94. The Tekiye. (Monasteries).

Other architectural structures, which properly serve for scientific or benevolent purposes or are intended for the habitations of a certain class of mosque servants, secure a religious appearance by the fact, that arrangements for mosques are connected with them.

The Tekiye nearly corresponds to our monasteries.(Fig. 189). A corridor B extends around a rectangular court, paved or laid out as a garden, at the centre of which is found a water tank A with or without a fountain; upon this open the cells of the dervishes and a small mosque or sanjah C. In early times, the dervishes were indeed buried after death beneath the former. Somewhat apart, or as here in the lower story, is the court D of ablutions and privies. Adjoining the tekiye is usually a sebil E.

When the latter occurs separately, it is only to be accounted a religious structure in the sense, that it is the work of a pious foundation, and that in the kuttab (elementary school) above it, religious instruction is imparted. Otherwise its purpose is purely secular; the thirsty may obtain a drink from the cool vaults of the cistern, over which the sebil is built.

87

95. The Sebil.

The sebil is of rectangular plan, sometimes with additions of segmental or semicircular form, and it consists of a room paved with marble and with a rich ceiling, furnished like a faskiye, with one or more openings towards the street and closed by bronze lattices, before which are on the inside marble basins to supply water to those passing by. The water is obtained from cisterns beneath, whose vaults rest on columns or piers, and whose walls are plastered with mortar containing brick dust. Above it is the kuttab previously mentioned, with a small office and privies in an arrangement like a loggia. The ceiling of the school is likewise carefully constructed; but the walls are

usually merely coated with simple plaster of paris, while those of the sebil are generally decorated by faience tiles.(Fig. 190).

*Note 87. Literally translated: "the charitable gift."*

*Note 88. Part of the Tomb of Sultan El-Ghuri from the 16 th century in the Ghurije quarter at Cairo.*

The substructure is composed of 3 or 5 steps, by which persons ascend close to the sebil lattice and to the drinking vessels. The upper one has a little channel to receive the spilled water. The loggia openings of the kuttab are composed of one or more arches supported by marble columns, and the whole is crowned by a strongly projecting roof with carved woodwork and cut-out boards, resting on massive wooden corbels.(See Fig. 99).

96. The Hod. (Watering Trough).

Pious foundations also produced buildings with an arrangement for watering animals, called the Hod. These consist of a trough of cut stone several yards in length, which is frequently set against a wall richly decorated by ornaments and inscriptions, and it is covered by vaults or a wooden structure. (Compare the view of a hod at Cairo in Fig. 191).

97. The Medresseh.(Public School).

In contrast with the kuttab, the medresseh is the great public school, in which religion, penmanship and the sciences are taught. These public schools are so endowed, that the books are supplied, the pupils are fed and lodged, and the salaries of the instructors are paid, though usually in a very sparing manner.

The medresseh is always connected with a mosque or saujeh, and it contains in its adjoining buildings separate living rooms (Riwak[90]) in which students are lodged during the continuance of their period of study, separated according to their provinces or nationalitn. Here is to be mentioned the Medresseh of Sultan Hassan at the foot of the Citadel of Cairo, built in 1356-7, and already frequently designated as a mosque. It is one of the most important monuments of Arab architecture, although very numerous reminiscences of Byzantine are still appear, especially on the substructure of the dome. The four arches that support the octagonal drum of the restored dome are covered by stalactite shapes of wood in pendentive form, and the [illegible]

usually merely coated with simple plaster of paris, while those of the sebil are generally decorated by faience tiles.(Fig. 190).

*Note 87. Literally translated; "the charitable gift."*

*Note 88. Part of the Tomb of Sultan El-Churi from the 16 th century in the Ghurije quarter at cairo.*

The substructure is composed of 3 or 5 steps, by which persons ascend close to the sebil lattice and to the drinking vessels. The upper one has a little channel to receive the spilled water. The loggia openings of the kuttab are composed of one or more arches supported by marble columns, and the whole is crowned by a strongly projecting roof with carved woodwork and cut-out boards, resting on massive wooden corbels.(See Fig. 99).

96. The Hod. (Watering Trough).

Pious foundations also produced buildings with an arrangement for watering animals, called the Hod. These consist of a trough of cut stone several yards in length, which is frequently set against a wall richly decorated by ornaments and inscriptions, and it is covered by vaults or a wooden structure. (Compare the view of a hod at cairo in Fig. 191).

97. The Medresseh.(Public School).

In contrast with the kuttab, the medresseh is the great public school, in which religion, penmanship and the sciences are taught. These public schools are so endowed, that the books are supplied, the pupils are fed and lodged, and the salaries of the instructors are paid, though usually in a very sparing manner.

The medresseh is always connected with a mosque or saujah, and it contains in its adjoining buildings separate living rooms (Riwak[90]) in which students are lodged during the continuance of their period of study, separated according to their provinces or nationalitn. Here is to be mentioned the Medresseh of Sultan Hassan at the foot of the Citadel of Cairo, built in 1356-7, and already frequently designated as a mosque. It is one of the most important monuments of Arab architecture, although very numerous reminiscences of Byzantine art still appear, especially on the substructure of the dome. Its four arches that support the octagonal drum of the restored dome are covered by stalactite shapes of wood in pendentive form, and the liwans

of the hall of prayer are covered by solid pointed tunnel vaults, which rest on massive abutments. The court for ablutions lay on the western facade, but it is now obstructed.

*Note 89. Marcel. J.J. Egypte moderne. etc. Paris. 1851.*

*Note 90. See rooms 9 and 10 in Fig. 168.*

Of similar plan, though also in smaller dimensions, is the Medresseh of Sitte-Khawand-el-Baraka in the Tebbane quarter at Cairo (Fig. 192), also termed Umm-es-Sultan (i.e., of the Mother of Sultan Schaban), erected in 771 (in Mohammedan chronology). The two mausoleums of the building contain the remains of the mother and the son. Byzantine forms in the domes and the ornaments are less prominent here, than in that of Sultan Hassan.

98. Moristan. (Hospital).

Moristan is a Pesian word (Muristan) denoting a house for the sick, a refuge and a hospital. Since our Christian institutions of this kind have a chapel or official church, so is the Arab hospital provided with a mosque, and it further contains the tomb of the founder.

One of the grandest designs (whose greater portion is now in a ruined condition) was the Moristan Kalaun in Cairo, built within 13 months under Sultan Mansur Kalaun.

This had a separate hall for each disease and separate apartments for women; together with a great lecture hall, in which the chief physician gave medical lectures; beneath the dome of the tomb were taught the Koran and the traditions; a great adjoining hall contained the library, works on the exegesis of the Koran, languages, theology, jurisprudence, medicine , etc.; other roomsserved for keeping provisions and medicines. All sick persons were received and cared for without payment; teachers and pupils were supported by the State.

Architecturally notable are still the massive portal, built of black and white marble ashlars with the remains of a bronze covering on the leaves of the doors, and the ceiling of the entrance, constructed of carved beams. The passages are mostly covered by pointed cross vaults. Under the dome of the tomb, the mosaics of the kiblah with the beautiful dwarf arcades and their shell decoration, as well as the marble veneering of the lower, and the carved plaster-work of the upper parts of the

walls, are all worthy of consideration, no less than the perforated slabs of gypsum filling the windows and the Romanesque arrangement of coupled windows.

The plan in Fig. 193 gives the data derived for the purpose of the more important rooms on the ground plan. The rooms not otherwise indicated mostly served as rooms for the sick; its original form has nevertheless been entirely changed by repeated additions.

*Note to Fig. 193.*

*1. Mosque.*

*2. Mausoleum of founder.*

*3. Court with portico, where the physician was formerly consulted.*

*4. Present eye clinic.*

*5. Formerly cells for the insane.*

*Hatching indicates modern masonry.*

d. Secular Buildings.

"In secular buildings, palaces, baths, and houses, in accordance with the oriental custom of isolation from the exterior and an internal existence passing into dreamy thought, the entire plan was grouped around a court surrounded by porticos. Fountains produced a refreshing coolness, which could be enjoyed with comfort under the shade of the widely projecting roof."

---"Here likewise, we clearly meet with the basal principle of Moorish architecture, according to which the exterior is made severe and plain, but the interior is executed with the greatest magnificence. These rigid and massive wall masses have a warlike and repellent character. But after entering, one is suddenly surrounded by a magic charm, almost blinded by the unexpected magnificence.

As everywhere in the buildings of the Orient, the entire architectural design is grouped around open courts, surrounded by porticos and furnished with water tanks and fountains, about which a multitude of smaller rooms, chambers, corridors, and halls, are arranged in a varied manner." ---

Lübke, W. Geschichte der Architektur.
6 th edition. Vol. 1. p. 434 and 446.
Leipzig. 1884.

99. Cities founded.

In the earliest period of the Caliphs' empire, strategic rea-

reasons chiefly guided the conquerors in taking possession or founding cities, and in the second place were the interests of trade and the possibility of a convenient and constant supply to the site, of the products of the earth and of industry. Ancient cities on rivers or those on plains were chosen for permanent habitation, where there was an abundance of water for drinking and for purposes of luxury, which could be obtained from not too great a distance.

Thus Kufa commanded the traffic on the Euphrates, and Bassora ensured communication with the sea; both places were covered in the rear by deserts. Then were gradually developed in all parts of the empire great centres of power, traffic, and of Arab civilization; Bagdad on the mighty river, the city of Askar-Moskram in the province of Chuzistan, Shiraz in Farisitan, Mansura in Sind, Marw in Transoxia; in Syria, Hims (Emessa) and the noteworthy Damascus, the future centre of traffic for the products of Babylonia, Media, Assyria, and Persia, which were connected with the sea by routes with numerous caravanserais, in Arabia, Mecca and Medina; in Africa, Alexandria, Fostat, Barka, Qairwan, and in Spain, Toledo and Cordova.

100. City Walls and Gates.

Where this was not already the case, the habitations were, after antique models, surrounded by a wall and ditch, the enclosing walls being fortified by towers with strong gateways. Cairo preserved sixty such gates in its enclosing walls, two of which were built by Wexir Berd-Gamali in the 11 th century A.D. and still exist. The Gate of the Roman Citadel Babylon (located in the ruins of Fostat) served as a model for these, according to which the "Gate of Victory" Bab-en-Nasr, built of ashlars, and the Bab-el-Futuh were erected. An outer and an inner gateway, connected together by a vaulted passage (propugnaculum), flanked by semicircular or rectangular towers, formed the elements of the plan (Figs. 194, 195). Bab-en-Nasr exhibits especially beautiful stonecutting, with a vaulted winding stairway inside and a cross vault over the great passage way. Of beautiful and characteristic effect is also the previously mentioned "Gate of the Sun" in Toledo, with its horseshoe arched gateway and the blind arcade above it, with the

interlacing archivolts and the little bay-windows with zigzag arches on the circular structure. While the upper parts are subdivided with architectural beauty, plain ashlar walls without any animation or openings on the lower part of the towers chill the persons entering. In the same city still exists the Gate of Bisagra, somewhat heavier in elevation, whose gateway is still entirely concealed by a very tasteless rectangular tower, standing at the projecting angle of the city wall.[91]

*Note 91. See the complete plan of the Gate beautifully shown in the work; Monumentos Arquitectonicos de Espana. Madrid. Since 1879.*

101. City Streets.

The streets of the cities were and are still very narrow and irregular. the different quarters of the city, in which are but few open spaces(Midan), may be separated by gateways.

The narrow streets with lofty houses kept out the glowing southern sun and made possible abundant shade and coolness; the small area of ground made it possible to sprinkle it and to keep it damp. The separation of the quarters of the city favored the suppression of feuds, that broke out in the interior of the city, made more difficult the incursion of a hostile force, and simplified vigilance and rules for security.

102. Water Supply.

Water for drinking and luxury was often collected in cisterns and drawn therefrom, was raised from the rivers, or after Roman custom, it was led into the cities above ground on arcades. The arches of aqueducts assumed the forms of arches belonging to the prevailing architectural system, thus being chiefly the p pointed arch form.[92]

*Note 92. Thus the Aqueduct Salah-ed-Din, constructed of ashlars, extending between Fum-el-Khalig and the foot of the Citadel of Cairo, shows the Egyptian pointed arch.*

But innovations in this domain have not been rejected by the adherents of Islam, since for example, in Cairo, great steam pumps lift the water of the Nile, that is supplied to the inhabitants through a double system of pipes, filtered and unfiltered.

103. Bridges.

The same is also true of the forms of the arches of bridges,

and great examples of these are preserved in Persia and other places, which likewise partly serve as dams.

The Bridge Allah-Verdi-Khan (general of Abbas the Great) has 33 ogee arches and is 970 ft. long with a roadway 45.2 ft. wide, the height from the imposts to the roadway is 16.9 ft., and that of the gallery above it is 15.6 ft.

The Bridge of Hassan-Abad, built by Abbas II, is 38.4 ft. high and 414 ft. long. (Compare also the bridges in Spain and Sicily mentioned in the Table of Architectural Chronology on p. 5 et seq.)

104. Roads.

Little attention was generally paid to the construction of roads in the East. The streets of the cities consisted of the natural earth, more or less leveled, and sprinkged during the dry season of the year.

Careful repairing of the roads was less required, since the means of transportation consisted only of beasts of burdenand not of wagons. The first caliphs, who already had an extended postal and messenger service, devoted their attention chiefly to the maintenance of halting and relay stations, and of caravanserais at proper distances along the military roads.

105. Gardening.

Orientals early and zealously fostered the art of gardening, and Arab writers tell us of the former magnificence of such works. The garden walks were preferably laid out in straight lines, and the rectangle or regular polygon was chosen for open spaces or lawns. Porticos of light wooden lattice work covered by climbing plants or vines afforded shady walks. The picturesque late Roman garden designs, as described to us by Pliny, were abandoned, and only the ancient classic pergola was retained.

106. Waterworks.

Fountains arose from the water basins of marble or of common stone, and straight masonry channels carried the water for irrigating the different beds. A sakiya, a kind of wheel with clay pots fastened to a rope of palm fibres, or a tabut, an inclined wheel, or the shadoof, a bucket suspended from a lever, raised the water required for irrigation from the fountain and from the flowing stream.

-107. Nilometer.

The nilometers placed in various places in Egypt show careful observation of the phenomena peculiar to the great natural water-courses by Arab hydraulic engineers.

One of the architecturally most interesting arrangements of this kind, for determining the rising and falling of the stream, is the Nilometer on the island of Rodah (Figs. 196 to 198). It consists of a well, whose plan is square and 16.4 ft. on each side; this is connected with the Nile by a channel, and it has at its centre an octagonal pillar 17 ells high, on which the ancient Arab measures and Cufic inscriptions are engraved. The pillar extends to a depth of one ell into the foundation and is stayed at top by wooden struts (which frequently require re-renewal). The walls of the well are decorated internally by niches and columns, which bear Byzantine capitals.

At the lowest stage of the Nile, the water covers 7 ells; at a height of 15 ells and 16 kerats [98], the sheik of the Nile measures proclaims the "wesa", i.e., the height of the Nile necessary for irrigating all portions of the valley of the Nile.

*Note 98. The ell now employed in Lower and Upper Egypt equals 24 kerats and varies between 1.88 and 1.92 ft.(See Note 21).*

The slow rise of the stream begins on June 21; the "Nile criers" are met in the streets on July 3, who in the mornings cry the number of inches that the stream has risen. The wera gives the signal for cutting the Nile dykes. According to Herodotus and others, the Nile must rise 16 cubits or Egyptian ells in order to produce a good harvest year. (Hence 16 ells as 16 children play around the famous statue of Father Nile in the Vatican).

This Nilometer (Mykyas) was built in 716 A.D. by command of the Ommayade Soliman; it was later improved several times, and in 1036 - 1094, it received a domical roof supported by columns, which fell during the expedition of Napoleon, and it is now covered by a Turkish roof resting on wooden posts.

108. Palaces.

The palaces of the best period of Arab art have either entirely disappeared, or they no longer exist in their original form; yet a few remains of such in Persia and India, as well as some buildings of this kind in Cairo, partly untouched by

the storms of time, and lastly a few relatively well preserved palaces in Spain and Sicily, attest the former splendor of the princely residences.

The apartments of these palaces were grouped around courts or gardens, and those of the ground story were usually intended for transactions with the external world, while those in the upper stories were almost always reserved for the harem (family); certain arrangements of the latter, the latticed balconies and windows permitted the women on festal occasions to become spectators of the life and action in the courts and gardens, without exposing themselves to the gaze of the male world.

From the descriptions of the old Arab and Persian writers, we may conclude that the plans of the old palaces of the caliphs nearly corresponded to those of residences of later princes. it is self-evident that to the former applied a different scale of dimensions and of richness of furnishing.

It appears to have generally been a rule, that the festal and reception apartmentsshould be adorned with especial splendor, while most other rooms were more or less neglected or remained ouite bare.

109. Egyptian Palaces.

One of the oldest monuments of this kind is a still existing portion of the Palace ascribed to the Fatimide dynasty, in the Bein-el-Kasserin ouarter and of the period of the 10 to 12 th centuries (A.D.). The ground story is constructed of massive ashlars, has pointed tunnel vaults of ouarried stone, and it supports the high second story (durkah of the ka'ah is 85.5 ft. high), the mixed masonry with a widely projecting cornice supported by slightly inclined wooden brackets. In a court on the eastern facade are to be found historical inscriptions with the arms of Emir Besch-tak.[94]

*Note 94. He restored (according to Makrizi) the Palace in the year 1336 A.D.*

The interior of the Palace is incomplete and almost ruinous and is so changed by later additions in the course of centuries, that scarcely more than the great ka'ah in the second story appears in its original form.(fig. 199). The decoration of the interior has entirely disappeared with very few exceptions, especially that of the still magnificently ornamented paneled

ceiling. Strongly projecting bay-windows of turned lattice work enclose the small windows of the street facade.

Another building of this kind is the Palace in the Siufiye quarter in Cairo, of the year 753 (A.H.), ascribed to the Emir Taz. This was again restored in the year 1089 A.H. by Ali-Aga, Khasnadar-es-Saade, and it was changed into an Arab girls' school a few decades since. Unfortunately, by this change of purpose many characteristics of the monument were lost, and the great court was especially deformed by modern additions.

Yet the beautiful stalactite portal next the street even remains noteworthy, a makad with the arms of the builder on its stairs and a great ka'ah in the upper story.

The ground story is entirely covered by pointed cross and tunnel vaults, while the ceilings of the upper story consist of horizontal and visible carved wooden beams.

The arrangement of the windows of the ka'ah appears similar to that of the building of Nasr-Mohammed; but the court facades exhibit more alternation and relief by the arcades of the makad.

A similar Palace is designated by Makrizi as a medresseh, and it was built by the Emir Nasr-Mohammed (murdered by Sultan Barkook) in the year 808 (A.H.). Massive ashlars are characteristic of the monuments of this period, and with pointed tunnel and cross vaults of quarried stones and inserted ashlar bands are structural peculiarities of the ground story; the high upper story, on the contrary, is built of small cut stones. The facades of the building, which lies opposite the southern facade of the Mosque of Sultan Hassan in Cairo, are plain, with the exception of the northern one. The latter is ornamented by a great niche and the arms of the Emir. The ground story now serves as a storehouse, and the upper story is ruined.

The openings of the upper story partly consist of coupled round-arched windows, above which is also arranged the system of round windows usual on mosques.

110. Palaces at Damascus.

The writer of Motasim says of a palace of the Ommayyades in Damascus, that its floors were entirely paved with green marble (verde antique), and that in the middle of the court was a great basin for water with a constant supply, the water from

which irrigated a garden containing the most beautiful plants and song birds.

We can now only wonder at more recent designs there, but which have a grand architectural effect, and in which the courts and the taktabosh with their fountains are treated in the most charming manner.

111. Persian and Indian Palaces.

The ancient palaces of Persia, so far as may be decided from the ruins and from similar later buildings, were of extremely extensive plans, as a result of an extended system of courts and gardens with basins for water, kiosks, and baths.

The chief apartment was the still usual great open hall (taktabosh) turned toward the north, that in many cases was adorned by fountains and surrounded by galleries latticed to a certain height. The decorations were executed in glazed tiles, later in faience and marble mosaics. Fig. 200[95] gives a view of a hall in India in the Palace of the Mogul emperors at Delhi.

*Note 95. Reproduction from Le Bon.*

112. Palaces in North Africa.

Of the palaces erected on the northern coast of Africa, we know from Marmol (who wrote in the 15 th century A.D.), that they resembled the Spanish more than those in Cairo, and that architects were called[96] from Spain, and especially from Andalusia, to build them.

*Note 96. The Palace of the Bey in Tunis (1782 - 1815) exhibits notable ceilings as beautiful as the old Moorish, and as rich in painting and gilding as those in Granada. The mosaics of the courts and halls likewise recall those of the Palaces of Granada and of Seville.*

In Dar-el-Bey a small circular hall is remarkable, whose dome is decorated by delicate ornament of filagree-stucco.(A kind of work introduced from Moorish Spain).

113. Oldest Spanish Palaces.

The palaces of the Ommayyades in Spain, such as those of Rusafah, Mugeit, Merwan, Azzalira, and Dimisch, are known to us only by the descriptions of the earlier writers. There only now remains a very ancient ruin with painted arches, near the famous bridge over the Guidalquiver, probably that of the Palace of the governor of Cordova, Abu-Yehia.

From the 12 th century A.D. comes the oldest portions of the Alcazar at Seville, while the facade and the upper halls belong to the time of Pedro the Cruel (end of the 13 th century A.D.). The building is overloaded with faience and ornaments, which were in part inserted during the general restoration of the design under king Don Pedro.

Other famous monuments of the period are the Alcazar of Malaga, from the first half of the 13 th century, and the Alhambra (al-hamra = the red) of Granada, well known to every one, begun in 1136 A.D. and completed in the 13 th and 14 th centuries under Abu-Walid and Abu-Abdallah, with additions by Muley-Hassan. (See Fig. 201 and the adjacent Plate).

The Generalife, located above the Alhambra, was of the same period, and it was the summer residence of the princes of Granada. This small palace in two stories with a rectangular plan consisted of a great central hall, through which as a fraskiye, a stream of water flowed, with a spacious apartment on each side.

The Quarto Real de San Domenigo contained an Arab pavilion, that belonged to the Ramadan Palace of the former kings of Granada.

Here are found inscriptions executed in mosaics and in Cufic faience work, that excel in taste and refinement the decorations of the Alhambra, since usually about the middle of the 14 th century A.D., the palaces of greater Granada competed in splendor with the Alhambra. It is also settled by these magnificent buildings, that the Arab architecture of Spain laid just as little weight on the external architecture of its structures, as did that of the north coast of Africa and of Egypt. The Arab writers make especially prominent the beauty of the villas of Granada.

114. Sicilian Palaces.

In Sicily are preserved to us the well known Palaces Ziza and Cuba, from the 12 th century, the period of Norman monarchy, though not in their original form.

The former is 120 ft. long and 65.6 ft. wide, 82.0 ft. high, and it is a structure of carefully dressed ashlars, divided in three stories by horizontal belts, on the two upper ones having windows and blind arcades. The earlier frieze crowning the facades with a Kasamatic inscription was cut into battlements.

The decoration of the internal apartments consists of stalactites, glazed tiles and marble mosaics.

The Cuba has depressed pointed arches and is 103 ft. long, 59 ft. wide, and 55.8 ft. high; it likewise formerly had a high entablature with an Arab inscription.

The ekternal appearance of this monument somewhat recalls the mosques of Cairo by its broad surfaces of ashlar work; yet the sections of piers, architraves of doors and windows,[97] and of the string-courses are entirely different from theirs.

*Note 97. Both of these buildings are published in Hittorf & Zanth's Architecture Moderne de la Sicile, etc. Paris. 1862-35.*

115. Houses of Citizens.

It is not necessary here to go back to the huts of the troglodytes and the Arab stone houses in the Hauran and Yemen, to the earth, loam and earth-concrete huts of the Arab inhabitants of the river valleys, to the tents of the sons of the desert, to these generally similar primitive forms of human d dwellings. We here busy ourselves only with the Arab houses of the 7 th and later centuries A.D.

Arab writers state that the houses in Damascus were built af- the plans of late Roman dwellings, while in Irak and especially in Bagdad, the plan of the Persian house was taken as a model.

In accordance with oriental customs, these dwellings had next the street plain and whitewashed enclosing walls without windows, and in the uppermost story alone were placed latticed openings. The basal principle of the Arab house plan consists of :--

1. Grouping of the living rooms around courts and gardens.
2. Complete separation of the apartments of the sexes.
3. Prevention of any view of the court from the street through the frequently recessed main portal with stalactites, by a turn in the passage (dirkah); in this is found the seat of the doorkeeper (bauwab). The massive doors were fastened at night by sliding out a strong cross-bar (dirbas), which was pushed back into a horizontal hole in the wall in the day time.
4. Omission of windows on the side next the street, or in their arrangement at such a height, that a rider on a camel

could not look into the interior and in their protection by strong lattices. The placing of stalls for shops or workshops on the street side is then not unusual.

5. Enclosing by lattices the windows, bay-windows and openings into the halls in the upper stories, so that the women could see the life in the streets and overlook the ceremonies and festivals in the courts without being seen.

6. Placing the passage to the harem in a separate court, or when but one existed, in a part of this at the greatest possible distance from the entrance to the selamlik.(Men's rooms).

7. Arrangement of the rooms, kitchen, baths, stable, etc., with reference to the prevailing winds, and in the provision of ventilators (malka) to ventilate the apartments.

The older houses of the better type all had their rooms in the ground story covered by tunnel and cross vaults of stone, but the baths had perforated vaults of cast plaster of paris, and the other apartments had horizontal visible beam ceilings.

The apartments intended for the women were collectively termed the harem, whilh those designed for receiving men were designated the selamlik.

116. Chief Apartment.

The principal rooms of the residence of a wealthy citizen, which frequently competed with the palaces in magnificence and ornamentation, were:-- the fasaha, the faskiye, the taktabosh, the makad, the mandarah with the khasnah, and the ka'ah.

a. The Fasaha nearly corresponds to our vestibule, but it appears to have not been common in the early period, when the courts and the doorway were intended to receive followers and servants. But in the Osmanic period it became a principal room, from which doors opened into halls, chambers and corridors.

b. The Faskiye is a hall for summer use paved with marble, on one of whose walls water flows down in thin streams to cool the air. The water is collected in a marble channel at the bottom and runs along this open channel to a central basin with a fountain. This arrangement was executed in the most varied ways, frequently in fanciful forms, especially by Persians and Osmans.

c. The taktabosh is a room in the court, raised by only

one or two steps from its pavement and open toward the north, which is more common in Syria and Persia, while the makad is likewise placed on the southern side of the court, raised at least half the height of the story, and it is more common in Egypt.

d. The Makad is accessible from the court by a stairway that may be closed. Both this and the Taktabosh serve for receiving guests of the master during the summer months, but they are found only in the richer dwellings, while they are replaced in simpler designs by the Mandara, the usual reception room of the master. Beside the latter is the Khasneh (cabinet), to which the master can withdraw, and which temporarily serves as a room for strangers.

e. The Mandara, always in the ground story, is the chief apartment of the selamlik.

f. The Ka'ab in the upper story is the festival room of the harem. Both rooms have many similar forms in their architecture and decoration.

A distinction is made in them between two parts:--

g. The Durkah, the passage and also the standing place for servants, usually has a floor of marble mosaics, generally has a water basin and fountain at its centre, and on the side opposite the entrance doorway is a fan on columns (zsuffa) of stone or marble.

h. The Liwan is about a step higher, and it is covered by mats or rugs with masonry divans along its sides. Above these, the walls are covered about 6.5 ft. high with wooden paneling and cupboards, that are crowned by cornices for the reception of vessels and articles of copper and porcelain.

The surfaces of the walls between the cornice and the cove of the ceiling are covered by faience or plaster ornaments or by plain plastering. But the lower part of the wall, not covered by paneling, is usually decorated by marble mosaics.

The ceiling of the ka'ab corresponds in its divisions to the subdivision of the floor into the durkah and the liwans. While the former has a higher ceiling with a wooden dome, those of the latter are somewhat lower, and they are executed in visible horizontal beam construction; but these parts of the ceiling are separated by wooden arches set on stalactite

corbels, Figs. 202, 203 and 207[98] give examples of nine different forms of ceilings.

*Note 98. Reproduced from Monumentos Arquitetonicos de Espana. Madrid, since 1877.*

Such arches were constructed of masonry in the earlier buildings, like the domes of the durkah.(for example, Palace of the Emir Tazl).

The mandara differs from the ka'ah in that it usually has no dome or skylight, since the rooms of the second story are generally found above it. It also usually has only one liwan. Then the durkab is found at one end, while at the opposite end the openings with turned lattices and windows above them with brightly colored glass light the hall.

The very high rooms are ventilated by special latticed openings, almost always at the top of the wall.

In the plan of the ruins of the House of Gamal-ed-Din-es-Zahaby (Figs. 208, 209), the Sheik of the merchants, which was built in the year 1047 A. H. in the Hosch-Kadam quarter at Cairo, the letters signify:--

| | |
|---|---|
| A. Entrance to the house. | B. Durkah. |
| B'. Seat of the bauwab. | C. Courts. |
| D. Entrance to the makad G. | D'. Door to the harem. |
| K. Sewer from privy. | L. Fountain. |
| E. Mandara. | H. Ka'ah. |
| M. Khasneh. | G. Makad. |
| b,c. Liwans of the ka'ah. | d. Partition of turned latticework. |
| a,a. Its consoles. | |

In Fig. 210, the notation signifies:--

| | |
|---|---|
| A. Durkah. | b, b, b. Paneling. |
| a. Zsuffa. | b, e, c, b. marble mosaics. |
| B. Liwan. | E. Cupboards. |
| C. Divan. | F. Bay-window of turned latticework. |
| D. Cornice above paneling. | |

The courts, in which a great part of Arab family life passes, and which were covered by tent awnings during the greater festivals, to serve as a festal apartment for male guests, are entirely or partially paved. Some trees shade the ground, and running water or a draw well is never wanting here.

In Spain and in the countries on the northern coast of Africa,

porticos extend along the walls of the court, while these are replaced in Egypt by the turned lattice structures projecting in the upper stories.

On the courts of the houses of citizens open the doorways of the selamlik, of the servants' room, and of the kitchen, if the latter is operated by men, as well as those of the hand=mill, the stable, and of the storeroom.

Subordinate rooms of the ground story were usually divided in height, the upper mezzanine rooms being utilized as sleeping rooms for female slaves or as storerooms for the harem. In the country seat and even also in Cairo are to be found sometimes beside and above the doorways of simple dwellings childish paintings, especially of camels, lions, and of steam-boats, whereby the owner makes it known, that he has made the pilgrimage to Mecca.

Finally, reference is made to the three plans of an Arab house at Cairo in Figs. 204 to 206[99].

*Note 99. Reproduction from Ebers' Egypt.*

117. The Okella.

The chief purpose of the okellas and bazaars[100] is to afford guarded rooms for the sale and exchange of articles of manufacture and traffic.

*Note 100. Bazaar is really a Persian word, the Arab name being Suk. Buildings with large courts, which serve as warehouses for wholesale dealers, are called Wakkale, which the French have changed into Ocallah, Occal, and Okella.*

The former are generally surrounded on all sides by streets and are buildings with courts, which are arranged for sale shops and warehouses on both the court and street fronts of the ground story. In the court is almost always to be found a small building for religious ablutions with a mosallah in its upper story.

The sale shops are shaded by projecting roofs along the streets, when the entire street is not covered, while a portico supported by columns and piers generally extends around the court.

In the upper stories are dwellings for the poorer classes or separate rooms, which are let to strangers by the day.

118. The Bazaar.

Bazaars do not differ much from the sale shops of the okellas; they mostly consist of simple and often dingy alleys and passa-

passages, generally covered to keep out the sunshine, whose houses are divided into smaller and larger rooms open toward the street, and raised 1.79 to 3.28 ft. above the ground. These alleys surround a larger and usually massive building (khane) with an internal court, around which are grouped larger warerooms. Many older buildings of this kind in Cairo are architecturally very interesting and frequently still contain beautiful turned lattices. A larger number of these khanes together compose a city quarter; such city quarters were formerly separated by heavy gates clamped with iron.

In dustrial products of the same kind are offered for sale near each other, and they are subdivided in groups in the bazaar, so that there are divisions for coppersmiths, armorers, dry goods, perfumes, etc. Fig. 212 shows the subdivision of the booths, the covered alley 1, a ventilator 2 in the ceiling, sale booths 3, the open booths and shop 5, with the storerooms 4 behind them.

A representation of a bazaar with vaulted booths and alley belonging to the Tailors' Bazaar in Ispahan, a very rich and mounmental, though rather dry design, is given in the adjacent Fig. 211[101].

*Note 101. Reproduction from Coste.*

119. Caravanserais.

The Caravanserais or Khans are built in great numbers along the caravan routes and are erected on the grandest scale in Persia. Shah Abbas alone built 999 of them. They are generally regarded as public buildings in which people may stay without cost, since they are mostly erected with pious donations.

They are almost entirely constructed of brick masonry, rarely of cut stone, without special decoration. Their exterior usually appeabs like a small fortress, this style of building being frequently put to proof by the attacks of robbers. Their interior contains a great court for the reception of caravans, living rooms for the merchants and camel leaders, with stalls for the beasts of burden. The living rooms are generally arranged in the upper stories.

We mention here the Caravanserai of Maiar between Ispahan and Shiraz, and that of Said-Abat on the road from Ispahan to Teheran, and further the Caravenserai Passainggan between Cash-

Cashmere and Kum, built by a rich merchant, Hag-Mohammed-Baker of Kazwin, at the beginning of the 19 th century. The plan forms a square of 164 ft. on a side, at the angles of which are placed massive towers. The ground story is vaulted and the arches of the openings have the form of Persian ogee arches.

Another design of this kind on the road from Ispahan to Shiraz is the caravanserai of Amin-Abad (Figs. 213, 214) of octagonal plan, with a great octagonal court, around which are grouped the living rooms, while behind them and next the outside are the stalls, and the privies are placed in the eight angle towers. The design of the portalis imposing, the rooms of the ground story are vaulted. The width of the building between the extreme sides of the octagon is 190 ft. and its height is 21.3 ft., including the battlements.

120. Baths.

The Arab baths are in plan and especially in their heating arrangments properly, though but slightly changed,Roman baths.

A distinction is made between public and private baths. Both are steam baths, in which the steam produced in the boilers passes directly into certain rooms of the bath.

The public double Bath in the Surugiye quarter at Cairo, one for women and the other for men), represented in Figs. 215 and 216, shows at C and D the entrance doorways, usually built in the same form as the portals of the mosques. A is the corridor leading to the unwarmed room B (meslakh). This hall with broad liwans along the walls serves as a reception room for the bath guests before and after the bath, and it contains at the entrance a box for the sale of entrance tickets, further inside being an Arab coffee kitchen, and at the centre is a basin with a fountain. Its ceiling is supported by columns or other free supports, between which are beams for hanging and drying the bath linen. The hall is almost entirely lighted by skylights.

One passes from the meslakh through the doorway F into a second corridor with privies and to the room G (Bet-et-Auel), which is only slightly warmed by steam. H is the Harara, filled with very hot steam and supplied with fountains. Adjoining it are bathing cells with and without bath-tubs, the former being termed mahdas and the latter banefiye, both fitted

with stopcocks for hit and cold water. The floors of all these rooms are covered with marble slabs, as well as the base and the wall to a height of 1.64 to 2.46 ft.

At certain places are small basins about 2.62 ft. high, supported by small columns, with decorated marble slabs to receive the stopcocks. The walls are usually coated with plain whitewash made from marble lime, and the ceilings are constructed of perforated cast plaster vaults, whose ornamentally arranged openings are filled by bells of white or colored glass.(See the bath ceilings in Figs. 217 to 223).

On account of the mild climate, these public baths in Egypt are not furnished with arrangements for warming the floors and walls, as is the case in some built in Constantinople, for example, in the Bath Mohammed II published by Texier & Pullan,[102]. which is arranged entirely according to the Roman custom, consisting of apodyterium, tepidarium and caldarium, with a circulation of hot air through hollow tiles.

*Note 102. Texier & Pullan. Plate 57.*

The furnace for producing steam for the modern Bath in the Nahassin quarter in Cairo is shown in Figs. 224 to 227; here a indicates the place for burning the fuel. This consists of street sweepings, straw, and fragments of all kinds, whose ashes are removed through a small opening into b, to be there quenched and sold as ussermill. Smoke and hot air stream into the dome c, in which are placed four leaden boilers d.(Fig. 227). The spaces between the boilers are closed at top by brickwork, so that the smoke of the fireplace cannot enter the upper part c' of the dome, in which the steam is produced.

The smoke is led to the open air by the pipe f, while steam and hot water are conducted from the room c into the lower rooms e of the bath; e is the hanefiye of the bath.

The water needed for the bath is raised from a well into a water basin on the terrace (flat roof) of the bath.

The water is distributed by lead pipes; the stopcocks are rudely made of rough cast brass with handles of lead.

The doorways in the interior of the bath are small and are usually covered with red cloth, fastened on them by brass nails with large heads.

In Figs. 228 to 230 is further given the arrangement of a

private bath at Cairo in plan and section. A is the vestibule with privy B and the dressing room C; D is the bath, shown in section through the hypocaustum; E is the bath tub, F is a marble basin, G is the opening for admission of steam and H is the boiler.

The plans for a public bath in connection with a bazaar (an arrangement recalling our modern medicinal and luxurious baths) at Kaschan in Persia (Bazaar adji-Seid-Hussen) was published by Coste[103]. Remarkable are the lofty vaulted rooms, covered by domes and furnished with skylights, whose ogee arches and vaults partly rest on octagonal stone piers.

*Note 103. Coste. Plates 55 to 57.*

121. Houses of Peasants.

The buildings in the level country and the dwellings in the villages present nothing remarkable architecturally. They were merely buildings for utility, which, for example in Egypt, were then as now constructed of air-dried bricks, on which some ornamentation was attempted by setting some courses of bricks on edge, or they were projected.

An interesting example of a Persian house in Alvar is again given by Coste.(Plate 70). A square area is surrounded by a low wall, adjoining this being a one-story rectangular house covered by a tunnel vault (without roof), which contains a large room (also used as sleeping room) and a kitchen. The rooms receive light through an opening in the vault and through the doorway. Adjoining this structure is a shed for poultry. Against the court wall at right angles to this building is built another long room, which serves as a stable. Between the two is the entrance to the court, and near it is a detached, massive, small privy.

122. Dovecots, etc.

Architecturally more important than these peasants' houses are many structures for animals, and the dovecots are to be especially mentioned here, which are still frequently found in such great numbers in Persia and Egypt, and in such prominent places in the villages, that they give a characteristic expression of being an entire colony. It is singular that keeping the doves is carried on more for the manure, than for the flesh of the birds.

These dovecots are formed like towers, sometimes conical, sometimes square and diminished upwards, Which especially in the first form and richly ornamented, are like the low minarets in Persia(Figs. 231, 232).[106] To this species of buildings likewise belongs the Egyptian houses for fowls.

*Note 106. All illustrations in this half volume referring to buildings in Cairo and their details are, with few exceptions, based on original drawings by the author, made during recent years.*

Stables are exceedingly primitive in their arrangements and present nothing remarkable.

Bibliography of the Architecture of Islam.

Makrisi. Taki-ad-ain-Ahmed-al. Book of advice and opinion in the designation of the quarters and monuments. Egypt.. 1364 - 1441.

Daniell, Th. & W. Oriental Scenery or Views in Hiodostan, etc. London. 1795 - 1808. New edition. London. 1818.

Laborde, A.L.J. de. Voyage Pittoresque et Historique ed l'Espagne. Paris. 1807 - 1818.

Murphy, J.C. Arabian Antiquities of Spain. London. 1813-1816.

Ali Bey (properly; Domingo Badia y Leblich). Travels of Ali Bey in Morocco, Tripoli, Cyprus, Egypt, Arabia, Syria and Turkey between the years 1803 and 1807 etc. London. 1816.

Ker Porter. Travels in Georgia, Persia. London. 1821 - 1822.

Hammer-Purgstall. J von. Constantinopolis und der Bosporus, etc. Pesth. 1822.

Coquebert de Montbret. E. Extrait des Prolegomenes Historiques d'Ibn-Khaldoun, traduit de l'Arabe etc. Paris. 1824. New edition. 1827.

Coste. P. Architecture Arabe ou Monuments du Cairo, dessines et mesures pendant les annees 1820 -1822. Paris. 1824.

Hittorf, J.J. & L. Zahn. Architecture Moderne de la Sicile ou Recueil, etc. Paris. 1826 - 1835.

Lane, E.W. An Account of the Manners and Customs of Modern Egyptians. London. 1836. New editions in 1845 and 1861. German translation. Leipzig. 1856.

Texier, Ch. F. M. Description de l'Asie Mineure ... fait par l'ordre du Gouvernement Francais de 1833 a 1837 etc. Paris. 1839 - 1849.

Knight, H.G. Saracenic and Norman Remains, etc. London. 1840.

Texier, Ch.F.M. Description de l'Armenie, la Perse et la Mesopotamie etc. Paris. 1840 - 1852.

Gailhabaud, J. Monuments Anciens et Modernes. German edition by Kugler. Hamburg. 1842 - 1849.

Girault de Prangey. Essai sur l'Architecture des Arabes et des Mores en Espagne, en Sicile et en Barbarie. Paris. 1842.

Girault de Prangey. Choix d'Ornements Moresques de l'Alhambra. Paris. No date.

Hessemer, F.M. Arabische und Altitalienische Bauverzierungen. Berlin. 1842.

Villa Amil, P.de & Escusura. Espana Artistica y Monumental. Madrid. 1842 - 1850.

Flandin, E. & P. Coste. Voyage en Perse ...pendant les annees 1840 - 1842. Paris. 1843 - 1851.

Orlich, L.von. Reise in Ostindien, in Briesen an Alex. von Humboldt & Carl Ritter. 2 d. edit. Leipzig. 1845.

Monuments Arabes d'Egypte, de Syrie et de l'Asie Mineure. Paris. 1846.

Ravoisie, A. Exploration Scientifique de l'Algerie pendant les Annees 1840, 1841, 1842, publiee .... Beaux=Arts, Sculpture. Paris. 1846 - 1858.

Fergusson, J. Essay on the antient Topography of Jerusalem. London. 1847.

Goury, J. & O. Jones. Plans, elevations, sections and details of the Alhambra. London. 1851.

Marcel, J.J. Egypte Moderne etc. London. 1851.

Flandin, E. L'Orient. Paris. 1853 - 1867.

Fergusson, J. History of Architecture in all Countries. London. 1855. 2 d edit. 1874.

Die Baukunst der Araber. Als Einleitung zu einer Reihe Darstellungen von Gebäuden dieses Stils in Europa, Asien und Afrika. Allg. Bauz. 1856. p. 143 - 220. Plates 31 - 47.

Jones, O. Grammar of Ornament. London. 1856.

Caveda, J. Geschichte der Baukunst in Spanien. Translated from Spanish by P. Heyse; edited by F. Kugler. Stuttgart. 1858.

Wetzstein, J.G. Reiseberícht über Hauran und die Trachonen, nebst einem Anhange über die Sabaischen Denkmaler in Ost-Syrien. Berlin. 1860.

Davillier, J.Ch. Histoire des Sciences Hispano-Moresques a Reflets Metalliques. Paris. 1861.

Guerin, H.V. Voyage Archaeologique dans le Regence de Tunis, etc. Paris. 1862.

Gerlot. Voyage to Constantinople in 1860 etc. London. 1863.

Unger, F.W. Die Bauten Constantin's des Grossen am heilige Grabe zu Jerusalem. Reprint from Orient und Occi-

Occident, insbesondere in ihren gegenseitig Beziehungen, etc. Edited by T. Bendey. Jahrg. 1. Göttingen. 1863.

Vogue, M. de. Le Temple de Jerusalem etc. Paris. 1864.

Reber, F. Geschichte der Baukunst im Alterthume. Leipzig. 1864 - 1867.

Texier, Ch.F.M. & R.P.Pullan. Byzantine Architecture etc. London. 1865.

Falke, J.von. Das Alhambra-Ornament in :- Gewerbehalle. 1865. p. 145, 161.

Schack, A.F.von. Poesie und Kunst der Araber in Spanien und Sicilien. Berlin. 1865. 2 d edition. 1877.

Vogue, M. de. Syrie Centrale, Insciptions Semetiques, Architecture. Paris. 1865 - 1877.

Coste, M. Monuments Modernes de la Perse etc. Paris. 1867.

Bourgoin, J. Les Arts Arabes; Architecture, Menuiserie, Bronces, Plafonds, Revetements, Pavements, Vitraux, etc. Paris. 1868 - 1870.

Prisse d'Avennes. L'Art Arabe d'apres les Monuments du Cairo depuis le 8 e Siecle jusqu'a la fin du 16 e Siecle. Paris. 1869 - 1877.

Cunningham, A. Archaeological Survey of India. London. 1871.

Mahmoud-Bey. Le Systeme Metrique actuel d'Egypte. Copenhagen. 1872.

Die Ottomanische Baukunst. L'Architecture Ottomane. Text in German, French and Arabic languages. Constantinople (Berlin). 1873.

Adler, F. Der Felsendom und die heilige Grabeskirche zu Jerusalem: Sammlung gemeinverstandlicher wissenschaftlicher Vorträge. Heft 188.

Adler, F. Die Moscheen zu Constatinopel. Eine architektonische und baugeschichtliche Studie. Deutsch. Bauz. 1874. p. 65, 73, 81, 89, 97.

Kremer, A. Culturgeschichte des Orients unter den Khalifen. Vienna. 1875 - 1877.

Fergusson, J. History of Indian and Eastern Architecture. London. 1876.

Monumentos Arquitectonicos de Espana. Madrid. 1877 et seq.

Ebers, G. Aegypten in Bild und Wort. 1, 2 edit. Stuttgart. 1878 - 1879.

Batissier. Histoire de l'Art Monumental. Paris. 1880.
Rogers-Bey, E.Th. Le Blason chez les princes Musulmans de l'Egypte et de la Syrie in:--Brochure de l'Institut Egyptien. 1880.
Schlagintweit, E. Indien in Wort und Bild. Leipzig. 1880-81.
Ravaise, P. Essai sur l'Architecture et sur la Topographie du Caire d'apres Makrisi. Palais des Khalifs Fatimides in:-- Memoire de la Mission Archaeologique Francaise. 1881 - 1884.
Neumann, W.A. Die Grund-Idee des Moschenbaues etc. in Zeits-d. Oest. Ing. u. Arch. Verein. 1882. p. 35.
Sepp, J.N. & B. Sepp. Die Felsenkuppel, eine Justinianische Sophienkirche and die übrigen Tempel Jerusalems etc. Munich. 1882.
Choisy, A. L'Art de batir chaz les Byzantins. Paris. 1883.
Collinot & De Beaumont. Encyclopedie des Arts Decoratifs de l'Orient. Ornements Arabes. Paris. 1883 et seq.
Comite de Conservation des Monuments de l'Art Arabe. Proces=verbaux et Rapports. Cairo. 1883 et seq.
Le Bon, G. La Civilization des Arabes. Paris. 1883.
Longperier, A. de. Oeuvres, reunis par G. Schlumberber. Vol. 1. Archaeologie Orientale. Numismatique. Monuments Arabes. Paris. 1883.
Dieulafoy. L'Art Antique de la Perse, Achemeoides, Parthes, Sassanides. Paris. 1884 - 1885.
Dieulafoy. Reise in Westsyrien und Babylon. Translation in Illust. Zeits. für Lander- und Völkerkunde. 1884.
Junker von Langegg, F.A. Old Cairo and its Antiquities. Build. News. Vol. 46. p 434, 508, 546.
Lübke, W. Geschichte der Architektur. 6 th edit. Leipzig. 1884-5.
Huldermann, L. Ueber Stalaktiten-Bildung in der Arabischen Baukunst in Zeits. d. Arch- und Ing. Verein zu Hannover. 1885. p. 523.
Beckmann, J.D. Das Arabische Museum in Cairo in& Kunstgewerbebl. 1886. p. 193.
Huldermann, L. Wasser-und Trinkgefässe in Aegypten in Kunstgew. 1886. p. 218.
Adamy, R. Architektonik, etc. Architektonik des Muhamedanischen und Romanischen Stils. Hannover. 1887.

Yacoub-Artin-Pacha. Description de six lampes de mosque en verre emaillee. Cairo. 1887.

Jacobsthal, E. Das Mausoleum des Mahmud-Pacha in Constantinopel in:-- Deutsh. Bauz. 1888. p. 469.

Stanley, L.P. The Art of the Saracens in Egypt. O.O. 1888.

Berchem, M. von. Une Mosquee du Temps des Fatimides en Caire "Gami-el-Gouushi" in:/-- Memoire de l'Instatut Egyptien. 1889. vol. 2.

Bourgoin, J. Precis de l'Art Arabe et Materiaux pour servir a l'Histoire, a la Theorie, et a la Technique des Arts de l'Orient Musulman. Paris. 1889.

Jacobsthal, E. Ueber einige Arten orientalischer Mosaikarbeiten. Berlin. 1889.

Junghändel, M. Die Baukunst Spaniens in ihren hervorragendsten Werken dargestellt; mit text von C. Gurlitt. Dresden. 1889 - 1893.

Uhde, C. Baudenkmäler in Spanien und Portugal. Berlin. 1889-92.

Gosset, A. Les Coupoles d'Orient et d'Occident etc. Paris. 1890.

Bädeker, K. Palästina und Syrien, etc. 3 d edit. Leipzig. 1891.

Berchem, M. von. Notes d'Archaeologie Arabe. Journal Asiatique. Paris. Vol. 17 (1891), p.411; 18 (1891), p. 46; 19 (1892), p. 377.

Wegner, A. Die Moschee Sultan Selim II zu Adrianopel und ihre Stellung in der Osmanischen Baukunst in:-- Deutsch. Bauz. 1891. p 329, 341, 353.

Herz. La Polychromie dans la Peinture de l'Architecture Arabe en Egypte in:-- Brochure de l'Institut Egyptien. Cairo. 1893.

Riegel, A. Stilfragen. Grundlegungen zu einer Geschichte der Ornamentik. Berlin. 1893.

Bädeker, K. Aegypten. 3 d edit. Leipzig. 1894.

Franz-Pacha. Studie über Namen und Entstehung der Kunst der Völker des Islams in:-- Monatsschrift für den Orient. Vienna. 1894.

Gayet, A. L'Art Arabe. Paris. 1894.

Herz, M. Illustrirter Katalog des Arabischen Museums in Cairo. Cairo. 1895.

Boussac, P.H. Etude sur la Construction Egyptienne. La Const. Moderne. Year 10, p. 531, 544; year 11, p. 74,90.